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Small Wet/Dry Pumps







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Small Pumps and Pumping Systems

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To meet the diverse needs of applications ranging from analytical instrumentation, wet chemistry, R & D to light industrial, Edwards offers a comprehensive range of different pumping technologies. Refer to the application and accessory guide to select pumps and accessories for your application.

Oil Free Scroll Pumps

Scroll pumps are an excellent alternative to rotary vane pumps where oil free pumping is desirable. The innovative XDS pumps in particular use a bearing shield to isolate the vacuum environment from all forms of lubricant not only making them *totally dry*, but also protecting the bearing from any process gases. Vapor handling is enabled by an adjustable gas ballast; this allows the range of pumps to satisfy many applications that were previously off limits to scroll pumps.

- $\leq 2 \times 10^{-2} \text{ mbar} / \leq 1.5 \times 10^{-2} \text{ Torr}$
- 5 to 35 m³h⁻¹ / 2.9 to 20.6 ft³min⁻¹



Oil Sealed Rotary Vane Pumps



- $\leq 10^{-3}$ mbar $/ \leq 10^{-3}$ Torr
- $0.9 \text{ to } 32.3 \text{ m}^3\text{h}^{-1} / 0.5 \text{ to } 19.5 \text{ ft}^3\text{min}^{-1}$

This wide range of rugged pumps offers an excellent ultimate with good pumping speed. RV pumps have superior vapor handling capabilities, while operating quietly.

Oil Free Diaphragm Pumps

- ≤ 2 mbar / ≤ 1.5 Torr
- 0.6 to 2.0 m³h⁻¹ / 0.35 to 1.2 ft³min⁻¹

The D-LAB diaphragm pumps are made of corrosion resistant materials, to withstand attack from chemicals. They are ideal for applications such as gel drying and other wet chemistry processes. The XDD1 diaphragm pumps provide oil free backing for compound turbomolecular pumps.

Easy to Service

All Edwards pumps are designed for easy routine maintenance. Key components are easily accessible and, with RV and XDS pumps, no special tools are required. Service kits of guaranteed parts are available for routine service by the user. Worldwide support from the Edwards service organization is also available.

Quality Manufacture

Edwards pumps are manufactured on state of the art machine tools for high consistency of components. For example, RV rotors are manufactured in a robotic cell to remove errors and inconsistencies from the manufacturing process.



Applications

Edwards high performance pumps are used in many industrial and laboratory applications, including the following:

- Electron microscopes, mass spectrometry, residual gas analyzers and surface analysis
- · Epoxy degassing, powder materials processing
- · Solvent concentration
- Sterilization, distillation and centrifuges
- · Gel dryers and glove boxes
- Atomic emission spectrometers, nuclear physics, fusion technology and space research
- Vacuum ovens
- TV tube evacuation
- Automotive system filling
- Freeze drying
- · Vacuum metallurgy

Small Pumps: Application and Accessory Information

Use the information in the list below to select the best pump and accessories for your application. The information is given as a guide only; the optimum set-up may depend on your specific method of operation. Note that you need to buy the accessories separately, unless otherwise stated.

ATEX and Flammable Gases

The following standard pump models have an **internal** ATEX classification of 5 II 3 G c IIB T4:

- E2M0.7, E2M1.5
- E1M18, E2M18 & E2M28
- RV3, RV5, RV8, RV12
- XDS5, XDS10, XDS35i

The following standard pump models operating on hydrocarbon oil can be supplied with flameproof motors providing an **external** classification of

Il 2 G IIB T4 (or IIC):

- RV3, RV5, RV8, RV12
- E1M18, E2M18



Gel Dryers

Recommended pump: XDS or D-Lab. Suggested accessories for D-Lab: Separator.

Optional accessories for D-Lab: Condenser, gas ballast valve.

Rotary Evaporation and Vacuum Ovens

Recommended pump: XDS or D-Lab.
Suggested accessories for D-Lab: Separator.

Optional accessories for D-Lab: Condenser, gas ballast valve.

Centrifugal Concentration

Recommended pump: XDS.

Vacuum Filtration

Recommended pump: XDS or D-Lab.

Suggested accessories for D-Lab: Separator.

Optional accessories for D-Lab: Condenser, gas ballast valve.

Distillation/Extraction Apparatus

Recommended pump: XDS or D-Lab.

Suggested accessories for D-Lab: Separator.

Optional accessories for D-LAB: Condenser, gas ballast valve.

Freeze Dryers

Recommended pump: XDS or Rotary pumps. Suggested accessories: Mist filters, oil return.

MS Inlet Systems (like Electro-Spray)

Recommended pump: XDS35i or E2M28.

Suggested accessories for rotary pumps: Mist filter, oil return.

Suggested accessories for XDS: Silencer.

Load Locks, Fume Hoods and Glove Boxes

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: Mist filter, oil return.

Suggested accessories for XDS: Silencer.

Ultra High Speed Centrifuges

Recommended pump: XDS or Rotary pumps.

Suggested accessories: Mist filter

Suggested accessories for rotary pumps: Mist filters, oil return.

Leak Detection, Electron Microscopes, Mass Spectrometers and Lasers

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter.

Suggested accessories for XDS: Silencer.

Surface Science and Particle Size Analyzers

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter.

Suggested accessories for XDS: Silencer.

High Energy Physics

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter.

Suggested accessories for XDS: Silencer.

Helium or Rare Gas Recirculation

Recommended pumps: XDS

Backing Turbomolecular Pumps

Recommended pump: XDS, XDD1 or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter. Suggested accessories for XDS: Silencer.

Backing Diffusion Pumps

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter.

Suggested accessories for XDS: Silencer.

Refrigeration, Air Conditioning Systems

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: FL20K, Mist filter.

Suggested accessories for XDS: Silencer.

Vacuum Furnace

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: ITF20K, Mist filter.

Suggested accessories for XDS: Silencer.

Azide Forming Applications

Recommended pump: XDS or Rotary pumps.

Suggested accessories for rotary pumps: Mist filter.

Suggested accessories for XDS: Silencer.

Notes

- FL20K is an inlet trap, to prevent oil back-streaming.
- · ITF20K is an inlet trap, to capture dust particles.
- The gas ballast facility allows atmospheric air into the pump, minimizing the formation of condensates (which contaminate the oil in rotary pumps).
- An oil return kit is available for RV and EM18 and E2M28 pumps to allow oil to be returned from the mist filter to the pump. A gas ballast oil return is also available to allow oil to return and have gas ballast flow.

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Small Pumps and Accessories: Frequently Asked Questions

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Oil Mist

Question: What accessory do I use to trap oil mist (which all oil sealed pumps emit during pump down or with gas ballast)?

Answer: To meet regulations and preserve pump oil, fit a recommended Edwards oil mist filter (EMF) to the pump outlet, and connect the exhaust to an exhaust line.

Question: If I operate an RV pump continuously or with high inlet pressure, what accessories do I need?

Answer: Fit an Edwards mist filter (EMF) and a gas ballast oil return (GBOR) kit. Then the pump can be operated with the mode switch open and gas ballast oil return. The oil condensed in the filter will be continuously returned to the pump oil box.

Vapor Processing

Question: Which pump and accessories should I use if my process generates vapors which could condense in the pump?

Answer: You can choose either an XDS pump, or rotary pump. Gas ballast should be used with both pumps; to sweep the vapor through the pump. This prevents condensation and oil contamination. Operate the pump with gas ballast for at least an hour before and after use. Choose the size of pump taking into account the vapor pumping rate.

If you selected a rotary pump, then you should fit a gas ballast oil return kit and mist filter. Change the oil frequently and keep an oil change reminder tag on the pump.

D-Lab would also be a suitable alternative depending on required pumping speed.

Dust and Particle Processes

Question: Which pump and accessory should I use if my process generates dust or grit, which could clog or damage the pump?

Answer: Use a rotary pump fitted with an inlet dust filter. We do not recommend the use of scroll pumps or XDD1 pumps for these applications.

Special Chemical Cleaning Processes

Question: Which pump and accessory should I use if my process generates oxygen or ozone?

Answer: Use a rotary pump adapted to run with $\mathsf{Fomblin}^{\textcircled{\$}}$ oil or XDS. Contact Edwards for more information.

Question: Are there any special considerations if my pump will be used in the vicinity of organic gases, like propane?

Answer: Use a rotary pump fitted with a flameproof motor. Contact Edwards for more information.

Contamination

Question: Which pump and accessories should I use if I must ensure that my process and process chamber (operated below 0.1 mb) are not contaminated with oil from the pump?

Answer: Use an XDS scroll pump.

Alternatively, you can use a rotary pump with a FL20K foreline trap fitted to the system inlet. The trap contains activated alumina which traps the oil molecules. To maintain the alumina charge, bake the charge basket or replace as required.

Question: How can I reduce the noise level of my pump?

Answer: If the noise is only obvious during pumping down then fitting the exhaust with a silencer (XDS pumps), or fitting an exhaust line will reduce the level.

An alternative is to fit an acoustic enclosure. Contact Edwards for more information.

XDS5 Scroll Vacuum Pump



The XDS pumps are an innovative design which use a bearing shield to isolate the vacuum environment from all forms of lubricant, not only making it totally dry, but hermetically sealed. The shield also protects the bearing from any process vapors.

Adjustable gas ballast allows vapor to be handled and opens up the range of applications to many that were previously unsuited to scroll pumps. The XDS pumps are designed for pumping condensable vapors and use materials selected for a wide range of laboratory wet chemistry applications.



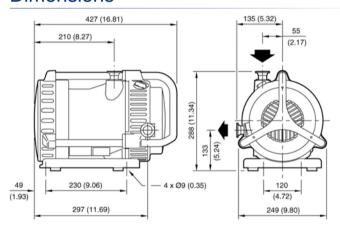
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Features & Benefits

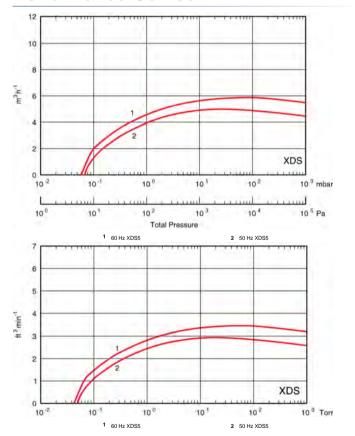
- Bearing shield
- Totally clean and dry vacuum
- No bearings or grease in the vacuum space
- No shaft seals, no bearing purges
- Simple single sided scroll design

Dimensions



Applications

- Analytical instruments
- Scanning Electron Microscopes SEM
- Beam lines and high energy physics
- Turbomolecular backing pumps
- Centrifuges, ultra-high speed



Displacement	
50Hz	$5.7 \mathrm{m}^3 \mathrm{h}^{-1} / 3.4 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	$6.7 \mathrm{m}^3\mathrm{h}^{-1}/4.0 \mathrm{ft}^3\mathrm{min}^{-1}$
Peak pumping speed ¹ 50Hz 60 Hz Ultimate vacuum (Total pressure)	4.8 m ³ h ⁻¹ / 2.8 ft ³ min ⁻¹ 6.0 m ³ h ⁻¹ / 3.5 ft ³ min ⁻¹
50Hz	7 x 10 ⁻² mbar / 5.3 x 10 ⁻² Torr
60 Hz	6 x 10 ⁻² mbar / 4.5 x 10 ⁻² Torr
Water vapour tolerance	50 mbar / 38 Torr
Water vapour capacity – GB I	70 gh ⁻¹
Water vapour capacity - GB II	200 gh
Motor power 1-ph and 3-ph	0.3kW
Nominal rotation speed	
50/60 Hz	1500 / 1800 rpm
Weight	23 kg / 51 lb
Inlet flange	NW25
Exhaust flange	NW25
Noise level	55 dBA @ 50 Hz
Leak tightness	<1 x 10 ⁻⁶ mbar ls ⁻¹
Operating temperature range	10 to 40 °C / 50 to 104 °F

Product Description	Order No.
XDS5 1-phase 115/230 V (set to 230 V) for Europe and UK.	A72401903
XDS5 1-phase 100/200 V (set to 200 V) for Japan.	A72401904
XDS5 3-phase 200/380/415/460 V set to high volts	A72401905
XDS5 1-phase 115/230 V (set to 115 V) for North America.	A72401906
Accessories & Spares	Order No.
Gas Ballast Adapter with 0.25mm hole	A50626801
Exhaust silencer XDS5/10	A50597000
Silencer spares kit	A50597800
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
Spares Kit Tip Seal XDS5-5C/10-10C	A72601805

XDS10 Scroll Vacuum Pump



The XDS pumps are an innovative design which use a bearing shield to isolate the vacuum environment from all forms of lubricant, not only making it totally dry, but hermetically sealed. The shield also protects the bearing from any process vapors.

Adjustable gas ballast allows vapor to be handled and opens up the range of applications to many that were previously unsuited to scroll pumps. The XDS pumps are designed for pumping condensable vapors and use materials selected for a wide range of laboratory wet chemistry applications.

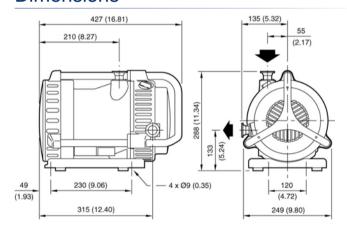


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Features & Benefits

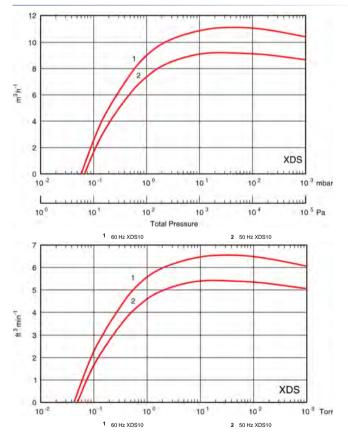
- Patented bearing shield
- Totally clean and dry vacuum
- No bearings or grease in the vacuum space
- No shaft seals, no bearing purges
- Simple single sided scroll design

Dimensions



Applications

- Analytical instruments
- Scanning Electron Microscopes SEM
- . Beam lines and high energy physics
- Turbomolecular backing pumps
- Centrifuges, ultra-high speed



Displacement	
50Hz	$11.3 \mathrm{m}^3 \mathrm{h}^{-1} / 6.7 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	$13.4 \mathrm{m}^3 \mathrm{h}^{-1} / 7.9 \mathrm{ft}^3 \mathrm{min}^{-1}$
Peak pumping speed ¹ 50Hz	9.3 m ³ h ⁻¹ / 5.5 ft ³ min ⁻¹
60 Hz	11.1 m 3 h $^{-1}$ / 6.5 ft 3 min $^{-1}$
Ultimate vacuum (Total pressure)	
50Hz	$7 \times 10^{-2} \text{ mbar} / 5.3 \times 10^{-2} \text{ Torr}$
60 Hz	6 x 10 ⁻² mbar / 4.5 x 10 ⁻² Torr
Water vapour tolerance	35 mbar / 23 Torr
Water vapour capacity – GB I	70 gh ⁻¹
Water vapour capacity - GB II	200 gh ⁻¹
Motor power 1-ph and 3-ph	300 W
Nominal rotation speed	
50/60 Hz	1500 / 1800 rpm
Weight	24.5 kg / 54 lb
Inlet flange	NW25
Exhaust flange	NW25
Noise level	55 dBA @ 50 Hz
Leak tightness	<1 x 10 ⁻⁶ mbar ls ⁻¹
Operating temperature range	10 to 40 °C / 50 to 104 °F

Product Description	Order No.
XDS10 1-phase 115/230 V (set to 230 V) for Europe and UK.	A72601903
XDS10 1-phase 100/200 V (set to 200 V) for Japan.	A72601904
XDS10 3-phase 200/380/415/460 V set to high volts	A72601905
XDS10 1-phase 115/230 V (set to 115 V) for North America.	A72601906
Accessories & Spares	Order No.
Gas Ballast Adapter with 0.25mm hole	A50626801
Exhaust silencer XDS5/10	A50597000
Silencer spares kit	A50597800
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000

XDS35i Scroll Vacuum Pump



The XDS35i pump has the same innovative bearing shield design as the XDS5 and XDS10. This isolates the vacuum environment from all forms of lubricant, not only making it totally dry but hermetically sealed. The shield also protects the bearing from any process vapors. Adjustable gas ballast allows vapour to be handled and opens up the range of applications to many that were previously unsuited to scroll pumps.

The inverter drive controls the motor characteristics and ensures the pump always runs at optimum speed and allows the user to control the pump remotely.

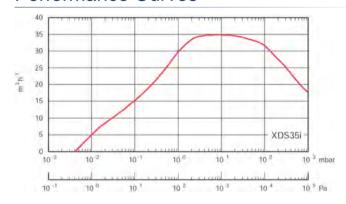


Analytical instruments - LCMS

Applications

- Automotive
- Beam lines and high energy physics
- Centrifuges, ultra-high speed
- Coating

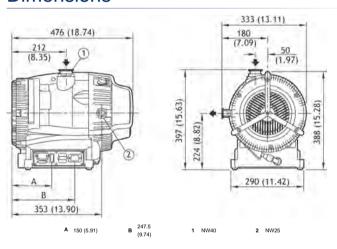
Performance Curves



Features & Benefits

- · Patented bearing shield
- Totally clean and dry vacuum
- No bearings or grease in the vacuum space
- No shaft seals, no bearing purges
- Simple single sided scroll design

Dimensions



Technical Data

Displacement (50 or 60Hz)	43 m ³ h ⁻¹ / 25 ft min -1
Peak pumping speed (50 or 60Hz)	35 m ³ h ⁻¹ / 21 ft ³ min ⁻¹
Ultimate vacuum (Total pressure)	1 x 10 ⁻² mbar / 8 x 10 ⁻³ Torr
Water vapour tolerance	35 mbar / 23 Torr
Water vapour capacity – GB I	70 gh ⁻¹
Water vapour capacity – GB II	240 gh ⁻¹
Motor power	0.52kW
Nominal rotation speed	1800 rpm
Weight	48 kg / 105 lb
Inlet flange	NW40
Exhaust flange	NW25
Noise level	57 dB (A)
Vibration	<4.5mms ⁻¹
Leak tightness	<1 x 10 ⁻⁶ mbar ls ⁻¹
Operating temperature range	10 to 40 °C / 50 to 104 °F

Ordering Information

Product Description	Order No.
XDS35i 100-120/200-230V, 1-ph, 50/60Hz with an IEC60320 connector, factory set to 230V	A73001983
Accessories & Spares	Order No.
Gas Ballast Adapter with 0.25mm hole	A50626801
Exhaust silencer XDS35i	A50597001
2m Electrical supply cable, UK, three-pin plug	A50505003
2m Electrical supply cable, North European plug	A50506003
2m Electrical supply cable, North America/Japan plug	A50507003
2m Electrical supply cable, no plug	A50508003
Tip seal kit XDS35i	A73001801
Silencer spares kit	A50597801

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E2M0.7 Two Stage Rotary Vane Pump



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The E2M0.7 is a small two stage oil sealed rotary vane pump that features a very low sound level of only 43 dB(A), compact dimensions, low energy consumption and low operating temperature. It will appeal to scientific instrument manufacturers and laboratory users for backing small turbomolecular or diffusion pumps as well as general laboratory applications.

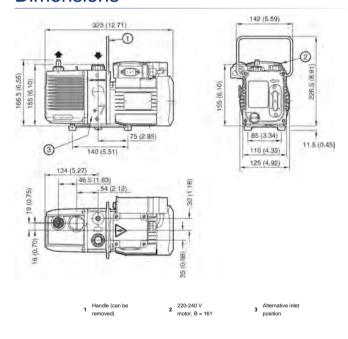
Fitted in a cabinet, the pump will be virtually inaudible and the low operating temperature will minimize the heat load on the equipment. Vertical vacuum inlet with horizontal option.

Supplied with: Ultragrade 15 oil, NW O-ring and centering ring.

Features & Benefits

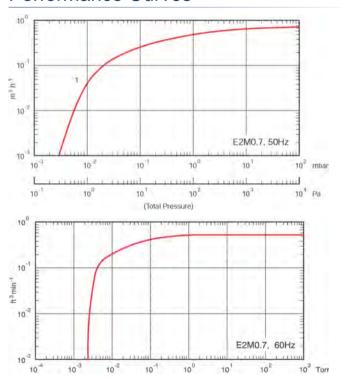
- Very low sound level of only 43 dB(A).
- The pump is designed for reliable, long-term operation.
- · Compact dimensions.
- Low energy consumption.
- Low operating temperature will minimize the heat load on the equipment.

Dimensions



Applications

- Analytical instruments
- · Leak detectors, Helium
- Research and development
- Backing Turbomolecular pumps



Displacement (swept volume) 50 Hz	0.9 m ³ h ⁻¹ / 0.5 ft ³ min ⁻¹
Displacement (swept volume) 60 Hz	1.1 m ³ h ⁻¹ / 0.6 ft ³ min ⁻¹
Speed (Pneurop 6602) 50 Hz	$0.75 \text{m}^3 \text{h}^{-1} / 0.4 \text{ft}^3 \text{min}^{-1}$
Speed (Pneurop 6602) 60Hz	$0.95 \mathrm{m}^3 \mathrm{h}^{-1} / 0.5 \mathrm{ft}^3 \mathrm{min}^{-1}$
Ultimate vacuum (total pressure)	
without gas ballast	$3 \times 10^{-3} \text{ mbar} / 2.3 \times 10^{-3} \text{ Torr}$
with full gas ballast	$2.0 \times 10^{-1} \text{ mbar} / 1.5 \times 10^{-1} \text{ Torr}$
Inlet connection	NW10 flange
Outlet connection	Nozzle 11 mm external Ø removable from 3/8 inch BSP tapped hole
Maximum permitted pressure at outlet	0.5 bar gauge / 7 psig
Maximum inlet pressure for water vapour	15 mbar / 11 Torr
Maximum water vapour pumping rate	8 g h ⁻¹
Motor power	0.09 kW
Operating temperature range	12 - 40 °C
Weight, without oil	10 kg / 22 lbs
Noise	43 dB(A) @ 50 Hz
Oil capacity - maximum	0.28 litre

0.2 litre

Ultragrade 15

Technical Data

Oil capacity - minimum

Recommended oil (supplied)

Product Description	Order No.
E2M0.7 200-230V, 1-ph, 50/60Hz, IEC 60320 connectors	A37141919
E2M0.7 100-120V, 1-ph, 50/60Hz, IEC 60320 connectors	A37141902
Accessories & Spares	Order No.
Model EMF3 mist filter	A46220000
NW10 x 3/8 Bsp Adapter	A25908064
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
Spares Kit C&O E2M0.7/1/1.5	A37101131
Spares Kit Blade E2M0.7/1.5	A37101132
NW10/10 Centring Nitrile S/S Pk1	C10511396
NW10 O Ring Viton Pk 5	H02124032
Vibration isolator for E2M0.7 and E2M1.5	A24801407

E2M1.5 Two Stage Rotary Vane Pump



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The E2M1.5 is a two stage oil sealed rotary vane pump suitable for many bench type applications. The pump features an alternative inlet connection position at the side of the pump so that overall installation height can be reduced to a minimum when required.

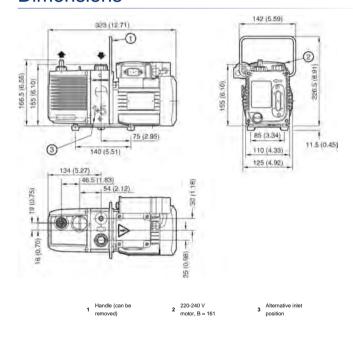
The interstage version features an additional pumping port to provide a rough vacuum for auxiliary duties.

Supplied with: Ultrgrade 15 oil, NW O-ring and centering ring.

Features & Benefits

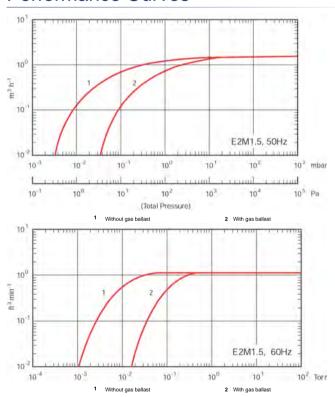
- The pump is designed for reliable, long-term operation.
- · Compact dimensions.
- Low energy consumption.
- The interstage version features an additional pumping port to provide a rough vacuum for auxiliary duties.
- The pump is a free-standing unit.

Dimensions



Applications

- Analytical instruments
- · Laboratory bench top vacuum
- · Leak detectors, Helium
- Research and development
- Backing turbomolecular pumps



Displacement (swept volume) 50 Hz	1.8 m ³ h ⁻¹ / 1 ft min -1
Displacement (swept volume) 60 Hz	2.2 m ³ h ⁻¹ / 1.3 ft ³ min ⁻¹
Speed (Pneurop 6602) 50 Hz	$1.6 \text{m}^3 \text{h}^{-1} / 0.8 \text{ft}^3 \text{min}^{-1}$
Speed (Pneurop 6602) 60 Hz	$2.0 \text{ m}^3 \text{ h}^{-1} / 1.2 \text{ ft}^3 \text{ min}^{-1}$
Ultimate vacuum (total pressure)	
without gas ballast	3 x 10 ⁻³ mbar / 2.3 x 10 ⁻³ Torr
with gas ballast	$2.5 \times 10^{-2} \text{ mbar} / 1.9 \times 10^{-2} \text{ Torr}$
Inlet connection	NW10 flange
Outlet connection	Nozzle 11 mm external diameter removable from hole tapped 3/8 inch BSP
Maximum permitted pressure at outlet	0.5 bar gauge / 7 psig
Maximum inlet pressure for water vapour	15 mbar / 11 Torr
Maximum water vapour pumping rate	16 g h ⁻¹
Motor power 50/60 Hz (IP54)	0.16 kW
Operating temperature range	12 - 40 °C
Weight	10 kg / 22 lbs
Noise	54 dB (A) @ 50 Hz

0.28 litre 0.2 litre

Ultragrade 15

Technical Data

Oil capacity - maximum

minimum
Recommended oil (supplied)

Product Description	Order No.
E2M1.5 200-230V, 1-ph, 50/60Hz, IEC 60320 connectors	A37132919
E2M1.5 100-120V, 1-ph, 50/60Hz, IEC 60320 connectors	A37132902
E2M1.5 interstage 200-230V, 1-ph, 50/60Hz, IEC 60320 connectors	A37104919
E2M1.5 interstage 100-120V, 1-ph, 50/60Hz, IEC 60320 connectors	A37104902
Accessories & Spares	Order No.
Model EMF3 mist filter	A46220000
NW10 x 3/8 Bsp Adapter	A25908064
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
Spares Kit C&O E2M0.7/1/1.5	A37101131
Spares Kit Blade E2M0.7/1.5	A37101132
NW10/10 Centring Nitrile S/S Pk1	C10511396
NW10 O Ring Viton Pk 5	H02124032
Vibration isolator for E2M0.7 and E2M1.5	A24801407

RV3 Two Stage Rotary Vane Pump



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Edwards RV pumps have become the industry standard for scientific primary pumping applications. RV pumps are uniquely capable of delivering high or low throughputs with high ultimate vacuum. This, combined with ultra-low noise levels, makes them ideal for a wide range of applications including GCMS and other small bench top type applications.

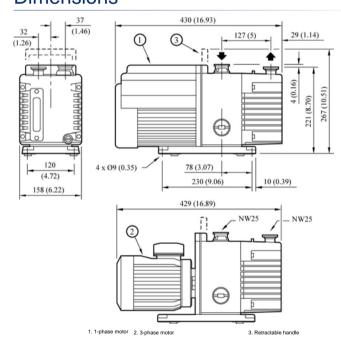
All pumps are approved to UL and CSA standards by an external test house. Edwards has a global network, providing world-wide support for product applications and service.

Supplied with: 1 liter of Ultragrade 19 oil, inlet filter and O-ring.

Features & Benefits

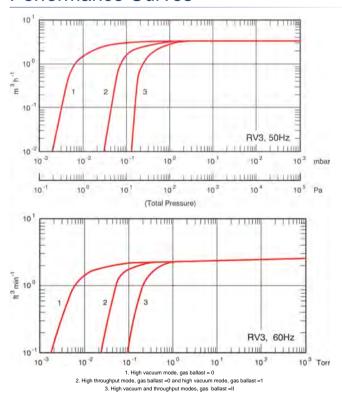
- 48 dBA and intrusive frequencies minimised.
- Dual mode. Suitable for high throughput and high vacuum applications.
- Easy-to-use gas ballast.
- Fast acting inlet valve for system protection.
- High torque, dual voltage/dual frequency motor, electronic start relay.

Dimensions



Applications

- Analytical instruments
- · Laboratory bench top vacuum
- Turbomolecuar backing pumps
- Freeze drying
- Research and development



Displacement	
50Hz	$3.7 \text{m}^3 \text{h}^{-1} / 2.2 \text{ft}^3 \text{min}^{-1}$
60Hz	$4.5 \mathrm{m}^3 \mathrm{h}^{-1} / 2.6 \mathrm{ft}^3 \mathrm{min}^{-1}$
Speed (Pneurop 6602)	
50Hz	$3.3 \mathrm{m}^3 \mathrm{h}^{-1} / 2 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	$3.9 \text{ m}^3 \text{ h}^{-1} / 2.3 \text{ ft}^3 \text{ min}^{-1}$
Ultimate pressure (high vac mode)	2.0 x 10 ⁻³ mbar / 1.5 x 10 ⁻³ Torr
Ultimate pressure GB I (high vac mode)	$3.0 \times 10^{-2} \text{ mbar} / 2.3 \times 10^{-2} \text{ Torr}$
Ultimate pressure GB II (High throughput mode)	$1.2 \times 10^{-1} \text{ mbar} / 9.1 \times 10^{-2} \text{ Torr}$
Water vapor tolerance	80 mbar / 60 Torr
Water vapor capacity - GB I	60 g/h
Water vapor capacity – GB II	220 g/h
Motor power 50/60Hz	450 / 550W
Nominal rotation speed 50/60Hz	1500 / 1800rpm
Weight (without oil)	25 kg / 55 lb
Oil capacity	0.7 liters
Recommended oil	Ultragrade 19
Inlet flange	NW25
Exhaust flange	NW25

48 dBA @ 50 Hz

12 – 40 °C

Technical Data

Noise level

Operating temperature range

Product Description	Order No.
RV3 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe	A65201903
RV3 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan	A65201904
RV3 200-220/380-415V, 3-ph, 50Hz and 200- 230/460V, 3-ph, 60Hz Factory set to 380/460V	A65201905
RV3 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA	A65201906
PFPE RV3 115/230V, 1-ph, 50/60 Hz, Factory set to 230V for Europe	A65209903
PFPE RV3 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan	A65209904
PFPE RV3 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V	A65209905
PFPE RV3 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA	A65209906
Accessories & Spares	Order No.
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
RV gas-ballast adaptor	A50502000
RV exhaust nozzle kit	A50509000
Model EMF10 mist filter	A46226000
Blade Kit RV3	A65201130
Spares Kit Outer Shaft Seal Kit RV	A65201134
Spares Kit Inlet Valve RV3/5/8/12	A65201036
Vibration isolator for RV, E1M/E2M18, XDS	A24801404

RV5 Two Stage Rotary Vane Pump



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Edwards RV pumps have become the industry standard for scientific primary pumping applications. RV pumps are uniquely capable of delivering high or low throughputs with high ultimate vacuum. This, combined with ultra-low noise levels, makes them ideal for a wide range of applications and environments.

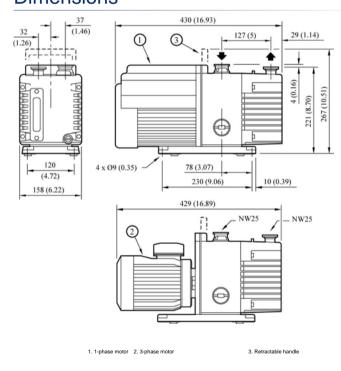
All pumps are approved to UL and CSA standards by an external test house. Edwards has a global network, providing world-wide support for product applications and service.

Supplied with: 1 liter of Ultragrade 19 oil, inlet filter and O-ring. Fomblin must be purchased separately for PTFE RV pumps.

Features & Benefits

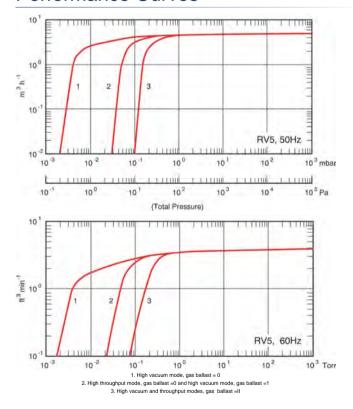
- 48 dBA and intrusive frequencies minimised.
- Dual mode. Suitable for high throughput and high vacuum applications.
- · Easy-to-use gas ballast.
- Fast acting inlet valve for system protection.
- High torque, dual voltage/dual frequency motor, electronic start relay

Dimensions



Applications

- Analytical instruments
- Centrifuges, ultra-high speed
- Coating
- Degassing/curing oil, epoxy resin
- Distillation/extraction/filtration



Displacement	
50Hz	$5.8 \mathrm{m}^3 \mathrm{h}^{-1} / 3.4 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	$5.0 \text{ m}^3 \text{ h}^{-1} / 2.9 \text{ ft}^3 \text{ min}^{-1}$
Speed (Pneurop 6602)	
50Hz	$5.1 \text{ m}^3 \text{ h}^{-1} / 3.0 \text{ ft}^3 \text{ min}^{-1}$
60Hz	$6.2 \mathrm{m}^3 \mathrm{h}^{-1} / 3.7 \mathrm{ft}^3 \mathrm{min}^{-1}$
Ultimate pressure (high vac mode)	$2.0 \times 10^{-3} \text{ mbar} / 1.5 \times 10^{-3} \text{ Torr}$
Ultimate pressure GB I (high vac mode)	$3.0 \times 10^{-2} \text{ mbar} / 2.3 \times 10^{-2} \text{ Torr}$
Ultimate pressure GB II (High throughput mode)	$1.0 \times 10^{-1} \text{ mbar} / 7.5 \times 10^{-2} \text{ Torr}$
Water vapor tolerance	50 mbar / 38 Torr
Water vapor capacity - GB I	60 g/h
Water vapor capacity - GB II	220 g/h
Motor power 50/60Hz	450 / 550W
Nominal rotation speed 50/60Hz	1500 / 1800rpm
Weight (without oil)	25 kg / 55 lb
Oil capacity	0.7 liters
Recommended oil	Ultragrade 19
Inlet flange	NW25
Exhaust flange	NW25

48 dBA @ 50 Hz

12 – 40 °C

Technical Data

Noise level

Operating temperature range

Product Description	Order No.
RV5 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe	A65301903
RV5 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan	A65301904
RV5 200-220/380-415V, 3-ph, 50Hz and 200- 230/460V, 3-ph, 60Hz, Factory set to 380/460V	A65301905
RV5 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA	A65301906
PFPE RV5 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe	A65309903
PFPE RV5 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan	A65309904
PFPE RV5 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V	A65309905
PFPE RV5 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA	A65309906
Accessories & Spares	Order No.
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
RV gas-ballast adaptor	A50502000
RV exhaust nozzle kit	A50509000
Model EMF10 mist filter	A46226000
Spares Kit RV3/5/8/12	A65201131
Spares Kit Blade RV5	A65301130
Spares Kit Inlet Valve RV3/5/8/12	A65201036
Spares Kit Cartridge RV5	A65301032

RV8 Two Stage Rotary Vane Pump



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Edwards RV pumps have become the industry standard for scientific primary pumping applications. RV pumps are uniquely capable of delivering high or low throughputs with high ultimate vacuum. This, combined with ultra-low noise levels, makes them ideal for a wide range of applications and environments.

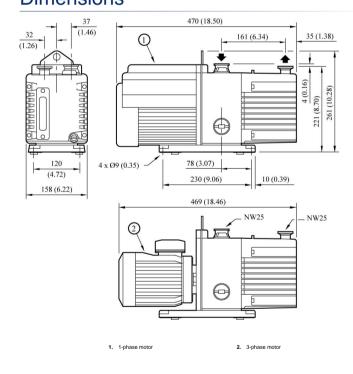
All pumps are approved to UL and CSA standards by an external test house. Edwards has a global network, providing world-wide support for product applications and service.

Supplied with: 1 liter of Ultragrade 19 oil, inlet filter and O-ring. Fomblin must be purchased separately for PTFE RV pumps.

Features & Benefits

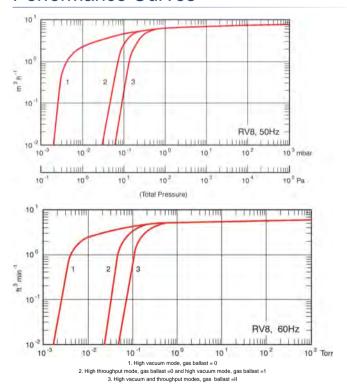
- 48 dBA and intrusive frequencies minimised.
- Dual mode. Suitable for high throughput and high vacuum applications.
- · Easy-to-use gas ballast.
- Fast acting inlet valve for system protection.
- High torque, dual voltage/dual frequency motor, electronic start relay.

Dimensions



Applications

- Analytical instruments
- Centrifuges, ultra-high speed
- Coating
- Degassing/curing oil, epoxy resin
- Distillation/extraction/filtration



Displacement	
50Hz	$9.7 \mathrm{m}^3 \mathrm{h}^{-1} / 5.7 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	11.7 m ³ h ⁻¹ / 6.9 ft min ⁻¹
Speed (Pneurop 6602)	
50Hz	$8.5 \mathrm{m}^3 \mathrm{h}^{-1} / 5 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz	$10 \text{ m}^3 \text{ h}^{-1} / 5.9 \text{ ft}^3 \text{ min}^{-1}$
Ultimate pressure (high vac mode)	$2.0 \times 10^{-3} \text{ mbar} / 1.5 \times 10^{-3} \text{ Torr}$
Ultimate pressure GB I (high vac mode)	$3.0 \times 10^{-2} \text{ mbar} / 2.3 \times 10^{-2} \text{ Torr}$
Ultimate pressure GB II (High throughput mode)	6 x 10 ⁻² mbar / 4.6 x 10 ⁻² Torr
Water vapor tolerance	50 mbar / 38 Torr
Water vapor capacity - GB I	60 g/h
Water vapor capacity - GB II	220 g/h
Motor power 50/60Hz	450 / 550W
Nominal rotation speed 50/60Hz	1500 / 1800rpm
Weight (without oil)	28 kg / 61.6 lb
Oil capacity	0.75 liters
Recommended oil	Ultragrade 19
Inlet flange	NW25
Exhaust flange	NW25
Noise level	48 dBA @ 50 Hz
Operating temperature range	12 – 40 °C

RV8 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe RV8 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan RV8 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV8 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA PFPE RV8 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV8 100/200V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV8 200-220/380-415V, 3-ph, 50Hz, and 200-230/460V, 3-ph, 60Hz, Factory set to 200V for Japan PFPE RV8 200-220/380-415V, 3-ph, 50Hz, and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V PFPE RV8 115/230V, 1-ph, 50/60Hz, Factory set to 380/460V PFPE RV8 115/230V, 1-ph, 50/60Hz, Factory set to 115V for Europe Accessories & Spares Order No. 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor RV gas-ballast adaptor A5050000 RV exhaust nozzle kit A50509000 Model EMF10 mist filter A46226000 Spares Kit RV3/5/8/12 A65201131 Spares Kit Blade RV8 A65201134 Spares Kit Inlet Valve RV3/5/8/12 A65201036	Product Description	Order No.
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North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor RV exhaust nozzle kit A50509000 Model EMF10 mist filter A46226000 Spares Kit RV3/5/8/12 A65201131 Spares Kit Blade RV8 A65201134 Spares Kit Outer Shaft Seal Kit RV A65201036		A50506000
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Spares Kit RV3/5/8/12 A65201131 Spares Kit Blade RV8 A65401130 Spares Kit Outer Shaft Seal Kit RV A65201134 Spares Kit Inlet Valve RV3/5/8/12 A65201036	RV exhaust nozzle kit	A50509000
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_ •	Spares Kit Outer Shaft Seal Kit RV	A65201134
	Spares Kit Inlet Valve RV3/5/8/12	A65201036
Spares Kit Cartridge RV8 A65401032	Spares Kit Cartridge RV8	A65401032

RV12 Two Stage Rotary Vane Pump



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Edwards RV pumps have become the industry standard for scientific primary pumping applications. RV pumps are uniquely capable of delivering high or low throughputs with high ultimate vacuum. This, combined with ultra-low noise levels, makes them ideal for a wide range of applications and environments.

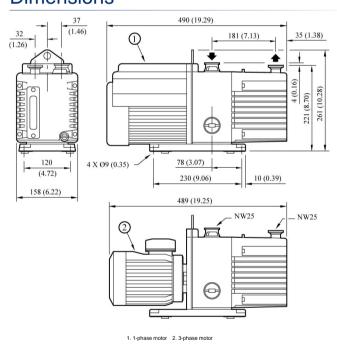
All pumps are approved to UL and CSA standards by an external test house. Edwards has a global network, providing world-wide support for product applications and service.

Supplied with: 1 liter of Ultragrade 19 oil, inlet filter and O-ring. Fomblin must be purchased separately for PTFE RV pumps.

Features & Benefits

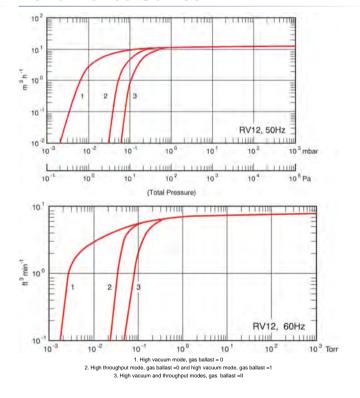
- 48 dBA and intrusive frequencies minimised.
- Dual mode. Suitable for high throughput and high vacuum applications.
- · Easy-to-use gas ballast.
- Fast acting inlet valve for system protection.
- High torque, dual voltage/dual frequency motor, electronic start relay.

Dimensions



Applications

- Analytical instruments
- Centrifuges, ultra-high speed
- Coating
- Degassing/curing oil, epoxy resin
- Distillation/extraction/filtration



Technical Data

Displa	cement	
50	Hz	14.2 m h ¹ / 8.4 ft min ¹
60	Hz	17 m ³ h ⁻¹ / 10 ft min -1
Speed	(Pneurop 6602)	
50	Hz	$12 \mathrm{m}^3 \mathrm{h}^{-1} / 7.1 \mathrm{ft}^3 \mathrm{min}^{-1}$
60	Hz	14.2 m h 1 / 8.4 ft min 1
Ultima mode)	te pressure (high vac	2.0 x 10 ⁻³ mbar / 1.5 x 10 ⁻³ Torr
Ultima mode)	te pressure GB I (high vac	$3.0 \times 10^{-2} \text{ mbar} / 2.3 \times 10^{-2} \text{ Torr}$
	te pressure GB II (High hput mode)	$1.2 \times 10^{-1} \text{ mbar} / 9.1 \times 10^{-2} \text{ Torr}$
Water	vapor tolerance	32 mbar / 24 Torr
Water	vapor capacity – GB I	60 g/h
Water	vapor capacity – GB II	290 g/h
Motor	power 50/60Hz	450 / 550W
Nomin	al rotation speed 50/60Hz	1500 / 1800rpm
Weigh	t (without oil)	29 kg / 63.8 lb
Oil cap	pacity	1 liter
Recon	nmended oil	Ultragrade 19
Inlet fla	ange	NW25
Exhau	st flange	NW25
Noise	level	48 dBA @ 50 Hz
Opera	ting temperature range	12 – 40 °C

RV12 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA PFPE RV12 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug RV gas-ballast adaptor RV exhaust nozzle kit A65501904 A65501905 A65501906 A65509903	Product Description	Order No.
200V for Japan RV12 200-220/380-415V, 3-ph, 50Hz and 200- 230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA PFPE RV12 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. A 65509906 A 65500900 A 65500000 A 650500000 A 650500000 A 650500000 RV gas-ballast adaptor A 65502000		A65501903
230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 115/230V, 1-ph, 50/60Hz, Factory set to 115V for USA PFPE RV12 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. A 65509906 A 65509908 A 655099		A65501904
### 115V for USA PFPE RV12 115/230V, 1-ph, 50/60Hz, Factory set to 230V for Europe PFPE RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA **Accessories & Spares** 2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug RV gas-ballast adaptor A65509903 A65509904 A65509904 A65509905 A65509905 A65509905 A65509905 A65509906 A50508000 A50508000 RV gas-ballast adaptor A50502000	•	A65501905
set to 230V for Europe PFPE RV12 100/200V, 1-ph, 50/60Hz, Factory set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. 2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug RV gas-ballast adaptor A65509905 A65509906 A6550990		A65501906
set to 200V for Japan PFPE RV12 200-220/380-415V, 3-ph, 50Hz and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. 2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug A50508000 RV gas-ballast adaptor A50502000		A65509903
and 200-230/460V, 3-ph, 60Hz, Factory set to 380/460V RV12 PFPE Two Stage Rotary Vane Pump 115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares Order No. 2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug RV gas-ballast adaptor A50502000		A65509904
115/230V 1ph 50/60Hz, Factory set to 115V for USA Accessories & Spares 2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor A65509906 A505050000 A50508000	and 200-230/460V, 3-ph, 60Hz, Factory set to	A65509905
2m electrical supply cable for 1-ph pumps, UK, Three-pin plugA505050002m electrical supply cable for 1-ph pumps, North European plugA505060002m electrical supply cable for 1-ph pumps, North America/Japan plugA505070002m electrical supply cable for 1-ph pumps, no plugA50508000RV gas-ballast adaptorA50502000	115/230V 1ph 50/60Hz, Factory set to 115V for	A65509906
Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor A50502000	Accessories & Spares	Order No.
North European plug 2m electrical supply cable for 1-ph pumps, North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor A50506000 A50507000 A50508000 A50502000		A50505000
North America/Japan plug 2m electrical supply cable for 1-ph pumps, no plug RV gas-ballast adaptor A50507000 A50508000 A50502000		A50506000
Plug RV gas-ballast adaptor A50502000		A50507000
		A50508000
RV exhaust nozzle kit A50509000	RV gas-ballast adaptor	A50502000
	RV exhaust nozzle kit	A50509000
Model EMF20 mist filter A46229000	Model EMF20 mist filter	A46229000
Spares Kit RV3/5/8/12 A65201131	Spares Kit RV3/5/8/12	A65201131
Spares Kit Blade RV12 A65501130	Spares Kit Blade RV12	A65501130
Spares Kit Outer Shaft Seal Kit RV A65201134	Spares Kit Outer Shaft Seal Kit RV	A65201134
Spares Kit Inlet Valve RV3/5/8/12 A65201036	Opares the Outer Shall Seal the tv	
Spares Kit Cartridge RV12 A65501032		A65201036

E1M18 One Stage, E2M18 Two Stage Rotary Vane Pumps 🍪



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The EM range of oil-sealed rotary pumps - renowned for their high ultimate vacuum, rapid pumping speed, quiet operation and ability to handle vapour - have become the industry standard for laboratory and light industrial applications.

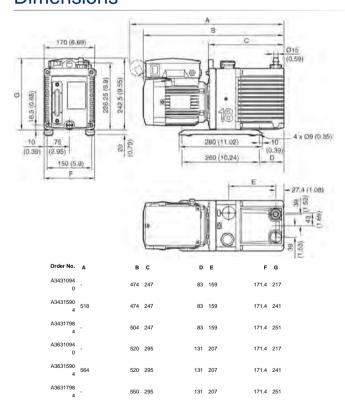
The E1M18 pump is a one-stage, direct drive, sliding vane pump. The pump is oil sealed and designed for reliable, long-term operation. The pump is a freestanding unit with the drive provided through a flexible coupling by either a single-phase or three-phase (fourpole) motor.

Supplied with: Ultragrade 19 oil, NW25 O-ring and centering ring.

Features & Benefits

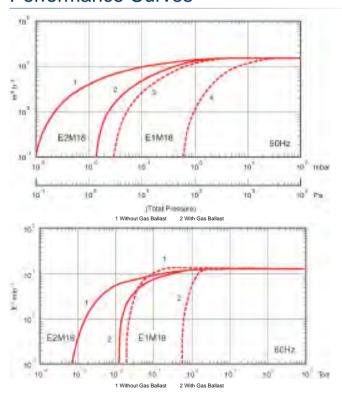
- The pump is designed for reliable, long-term operation.
- Thermal overload device prevents overheating (single phase only).
- The drive is provided through a flexible coupling by a singlephase or three-phase (four pole) motor.
- The motors are totally enclosed and are cooled by the motor-
- Pressure die cast oil box with integral oil seals prevents oil leaks.

Dimensions



Applications

- Analytical instruments
- · Leak detectors, Helium
- Research and development
- Backing Turbomolecular pumps



Technical Data

Speed (Pneurop 6602) 50 Hz	17.0 m ³ h ⁻¹ / 10 ft min ⁻¹
Speed (Pneurop 6602) 60Hz	$20.4 \mathrm{m}^3 \mathrm{h}^{-1} / 12.1 \mathrm{ft}^3 \mathrm{min}^{-1}$
Ultimate vacuum (total pressure)	
without gas ballast	$3 \times 10^{-2} \text{ mbar} / 2.2 \times 10^{-2} \text{ Torr}$
with gas ballast	$6.5 \times 10^{-1} \text{ mbar} / 4.8 \times 10^{-1} \text{ Torr}$
Inlet connection	NW25
Outlet connection	Nozzle 15 mm external Ø removable from 3/4 in BSP tapped hole
Maximum permitted pressure at outlet	0.5 bar gauge / 7 psig
Maximum inlet pressure for water vapour	50 mbar / 38 Torr
Maximum water vapour pumping rate	0.65 kg h ⁻¹
Motor power 50 Hz	0.55 kW
Motor power 60 Hz	0.75 kW
Weight	32 kg / 70 lbs
Noise	57 dB(A) @ 50 Hz
Oil capacity - maximum	1.4 litre
Oil capacity - minimum	0.9 litre
Recommended oil (supplied)	Ultragrade 19

Product Description	Order No.
E1M18 200-230/380-415V, 3-ph, 50Hz or 200- 230/460V, 3-ph, 60Hz	A34310940
E1M18 100/200V, 1-ph, 50Hz or 100-105/200- 210V, 1-ph, 60Hz	A34315904
E1M18 115/200-230V, 1-ph, 50/60Hz with IEC60320 connector, factory set to 230V	A34317984
E2M18 PFPE Two Stage Rotary Vane Pump 200-230/380-415 V, 3-ph, 50 Hz or 200- 230/460 V, 3-ph, 60 Hz	A36321940
E2M18 PFPE Two Stage Rotary Vane Pump 115/200-230 V, 1-ph, 50/60 Hz with IEC60320 connector fitted	A36325984
E2M18 200-230/380-415V, 3-ph, 50Hz or 200- 230/460V, 3-ph, 60Hz	A36310940
PFPE E1M18 115/200-230V, 1-ph, 50/60Hz with IEC60320 connector	A34325984
E2M18 100/200V, 1-ph, 50Hz or 100-105/200- 210V, 1-ph, 60Hz	A36315904
E2M18 115/200-230V, 1-ph, 50/60Hz with IEC60320 connector	A36317984
Accessories & Spares	Order No.
Flange NW25 Inlet Adapter	C10520201
Model EMF20 mist filter	A46229000
Flange NW25 Outlet Adapter	C10501414
2m Electrical supply cable, UK, three-pin plug	A50505003
2m Electrical supply cable, North European plug	A50506003
2m Electrical supply cable, North America/Japan plug	A50507003
2m Electrical supply cable, no plug	A50508003
Spares Kit C&O E1M18/E2M18	A36301131
Spares Kit Blade E1M18	A34301041
Spares Kit Blade E2M18	A36301020
NW25/25 Centring Nitrile S/S Pk1	C10514396
NW25 O Ring Viton Pk 5	H02124035

E2M28 Two Stage Rotary Vane Pump



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The EM range of oil-sealed rotary pumps - renowned for its high ultimate vacuum, rapid pumping speed, quiet operation and ability to handle vapor - has become the industry standard for industry and laboratory applications.

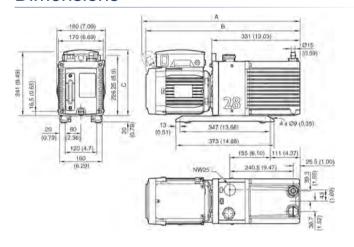
The E2M28 pump is a two-stage, direct drive, sliding vane pump. The pump is oil sealed and designed for reliable, long-term operation in both laboratory and industrial environments. The pump is a freestanding unit with the drive provided through a flexible coupling by either a single-phase or three-phase (four-pole) motor.

Supplied with: Ultragrade 19 oil, NW25 O-ring and centering ring, lifting plate.

Features & Benefits

- The pump is designed for reliable, long-term operation.
- Thermal overload device prevents overheating (single phase only).
- The pump is a free-standing unit.
- The drive is provided through a flexible coupling by a singlephase or three-phase (four pole) motor.
- The motors are totally enclosed and are cooled by the motorcooling fan.

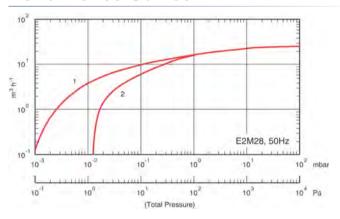
Dimensions

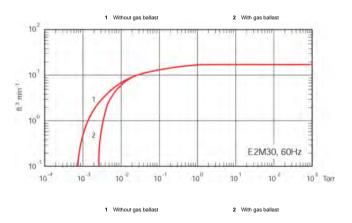


Ordering No.	A	В	С
A373-10-940		553	217
A373-15-904	598	584	251
4070 47 004		F04	054

Applications

- Analytical instruments LCMS
- Automotive
- Beam lines and high energy physics
- · Centrifuges, ultra-high speed
- Coating





Technical Data

Displacement (swept volume) 50 Hz	32.2m ³ h ⁻¹ / 19 ft ³ min ⁻¹
Displacement (swept volume) 60 Hz	38.9 m ³ h ⁻¹ / 22.3 ft ³ min ⁻¹
Speed (Pneurop 6602) 50 Hz	$27.5 \mathrm{m}^3 \mathrm{h}^{-1} / 16.2 \mathrm{ft}^3 \mathrm{min}^{-1}$
Speed (Pneurop 6602) 60Hz	33.0 m ³ h ⁻¹ / 19.5 ft ³ min ⁻¹
Ultimate vacuum (total pressure)	
without gas ballast	1 x 10 ⁻³ mbar / 7.5 x 10 ⁻⁴ Torr
with gas ballast	$1.5 \times 10^{-2} \text{mbar} / 1.1 \times 10^{-2} \text{Torr}$
Inlet connection	NW25 flange
Outlet connection	Nozzle 15 mm external Ø removable from 3/4 in BSP tapped hole
Maximum permitted pressure at outlet	0.5 bar gauge / 7 psig
Maximum inlet pressure for water vapor	30 mbar / 23 Torr
Maximum water vapor pumping rate	0.7 kg h ⁻¹
Motor power 50 Hz	0.75 kW
Motor power 60 Hz	0.90 kW
Weight	40 kg / 88 lbs
Noise	57 dB(A) @ 50 Hz
Oil capacity - maximum	1.5 liter
Oil capacity - minimum	1.2 liter
Recommended oil (supplied)	Ultragrade 19

Product Description	Order No.
E2M28 Two Stage Rotary Vane Pump 200- 230/380-415 V, 3-ph, 50 Hz or 200-230/460 V, 3-ph, 60 Hz	A37310940
E2M28 Two Stage Rotary Vane Pump 100/200 V, 1-ph, 50 Hz or 100-105/200-210 V, 1-ph, 60 Hz	A37315904
E2M28 Two Stage Rotary Vane Pump 115/200-230 V, 1-ph, 50/60 Hz with IEC60320 connector fitted	A37317984
E2M28 PFPE Two Stage Rotary Vane Pump 200-230/380-415 V, 3-ph, 50 Hz or 200- 230/460 V, 3-ph, 60 Hz	A37321940
E2M28 PFPE Two Stage Rotary Vane Pump 115/200-230 V, 1-ph, 50/60 Hz with IEC60320 connector fitted	A37325984
Accessories & Spares	Order No.
Model MF30 mist filter	A46233000
Flange NW25 Inlet Adapter	C10520201
Flange NW25 Outlet Adapter	C10501414
2m Electrical supply cable, UK, three-pin plug	A50505003
2m Electrical supply cable, North European plug	A50506003
2m Electrical supply cable, North America/Japan plug	A50507003
2m Electrical supply cable, no plug	A50508003
Spares Kit C&O E2M28	A37301131
	7.07.001.101
NW25 O Ring Viton Pk 5	H02124035

RV ATEX Two Stage Rotary Vane Pump

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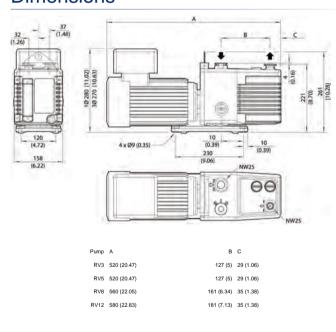
This variant of the RV pump has an **external** ATEX classification of Ex II 2G IIC T4 or Ex II 2G IIB T4 and is suitable for use in potentially explosive atmospheres. It shares the same **internal** ATEX classification as our standard RV pumps, namely Ex II 3G c IIB T4.

ATEX pumps with flameproof motors require the user to provide 2 off hazardous area cable glands and cables. In addition, connection of the thermistors to an appropriate safety circuit must be made to switch off the pump if overheating occurs.

Features & Benefits

- · ATEX rated spot voltage motor.
- 48 dBA and intrusive frequencies minimised.
- Dual mode. Suitable for high throughput and high vacuum applications.
- Fast acting inlet valve for system protection.
- Efficient high pressure lubrication.

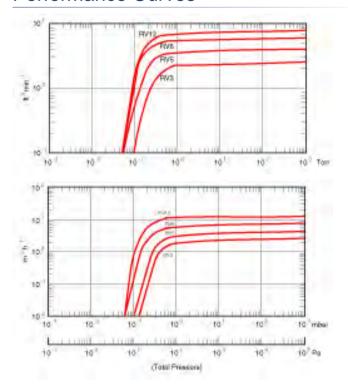
Dimensions



Applications

· Hazardous area pumping

Performance Curves



Technical Data

Please refer to the standard pump pages of this catalogue for detailed technical data, ignoring water vapour handling and gas ballast as the ATEX variants do not have this feature?

Product Description	Order No.
ATEX RV3 115V, 1-ph, 60Hz Ex II 2G IIC T4	A65218986
ATEX RV3 115V, 1-ph, 60Hz Ex II 2G IIB T4	A65218987
ATEX RV3 230V, 1-ph, 60Hz Ex II 2G IIB T4	A65218988
ATEX RV3 230V, 1-ph, 50Hz Ex II 2G IIC T4	A65218989
ATEX RV3 230V, 1-ph, 60Hz Ex II 2G IIC T4	A65218990

ATEX RV3 230V, 1-ph, 50Hz Ex II 2G IIB T4	A65218991
ATEX RV3 400V, 3-ph, 50Hz Ex II 2G IIC T4	A65218992
ATEX RV3 400V, 3-ph, 50Hz Ex II 2G IIB T4	A65218993
ATEX RV5 115V, 1-ph, 60Hz Ex II 2G IIC T4	A65318986
ATEX RV5 115V, 1-ph, 60Hz Ex II 2G IIB T4	A65318987
ATEX RV5 230V, 1-ph, 60Hz Ex II 2G IIB T4	A65318988
ATEX RV5 230V, 1-ph, 50Hz Ex II 2G IIC T4	A65318989
ATEX RV5 230V, 1-ph, 60Hz Ex II 2G IIC T4	A65318990
ATEX RV5 230V, 1-ph, 50Hz Ex II 2G IIB T4	A65318991
ATEX RV5 400V, 3-ph, 50Hz Ex II 2G IIC T4	A65318992
ATEX RV5 400V, 3-ph, 50Hz Ex II 2G IIB T4	A65318993
ATEX RV8 115V, 1-ph, 60Hz Ex II 2G IIC T4	A65418986
ATEX RV8 115V, 1-ph, 60Hz Ex II 2G IIB T4	A65418987
ATEX RV8 230V, 1-ph, 60Hz Ex II 2G IIB T4	A65418988
ATEX RV8 230V, 1-ph, 50Hz Ex II 2G IIC T4	A65418989
ATEX RV8 230V, 1-ph, 60Hz Ex II 2G IIC T4	A65418990
ATEX RV8 230V, 1-ph, 50Hz Ex II 2G IIB T4	A65418991
ATEX RV8 400V, 3-ph, 50Hz Ex II 2G IIC T4	A65418992
ATEX RV8 400V, 3-ph, 50Hz Ex II 2G IIB T4	A65418993
ATEX RV12 115V, 1-ph, 60Hz Ex II 2G IIC T4	A65518986
ATEX RV12 115V, 1-ph, 60Hz Ex II 2G IIB T4	A65518987
ATEX RV12 230V, 1-ph, 60Hz Ex II 2G IIB T4	A65518988
ATEX RV12 230V, 1-ph, 50Hz Ex II 2G IIC T4	A65518989
ATEX RV12 230V, 1-ph, 60Hz Ex II 2G IIC T4	A65518990
ATEX RV12 230V, 1-ph, 50Hz Ex II 2G IIB T4	A65518991
ATEX RV12 400V, 3-ph, 50Hz Ex II 2G IIC T4	A65518992
ATEX RV12 400V, 3-ph, 50Hz Ex II 2G IIB T4	A65518993

E1M18 One Stage, E2M18 Two Stage ATEX Rotary Vane Pumps

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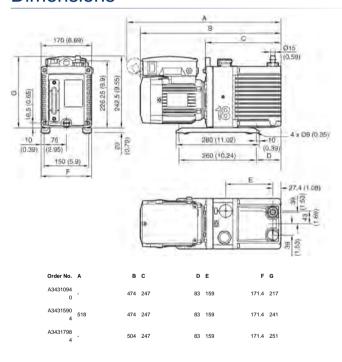
The E1M18 pump has an **external** ATEX classification of ¬ II 2G IIC T4 and is suitable for use in potentially explosive atmospheres.

ATEX pumps with flameproof motors require the user to provide 2 off hazardous area cable glands and cables. In addition, connection of the thermistors to an appropriate safety circuit must be made to switch off the pump if overheating occurs.

Features & Benefits

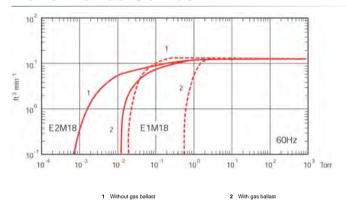
 Approved to external ATEX standards Ex II 2G IIC T4 and Ex II 2G IIB T4, which enables use in hazardous environments.

Dimensions



Applications

· Hazardous area pumping



 $20.4 \text{ m}^3 \text{ h}^{-1} / 12.1 \text{ ft}^3 \text{ min}^{-1}$ Speed (Pneurop 6602) 60Hz Ultimate vacuum (total pressure) $3 \times 10^{-2} \text{ mbar} / 2.2 \times 10^{-2} \text{ Torr}$ without gas ballast with gas ballast $6.5 \times 10^{-1} \text{ mbar} / 4.8 \times 10^{-1} \text{ Torr}$ NW25 Inlet connection Nozzle 15 mm external Ø removable from 3/4 in BSP Outlet connection tapped hole Maximum permitted pressure at

50 mbar / 38 Torr

0.5 bar gauge / 7 psig Maximum inlet pressure for

Maximum water vapour 0.65 kg h⁻¹ pumping rate Motor power 60 Hz 0.75 kW Weight 37 kg / 70 lbs 57 dB(A) @ 50 Hz Noise

Oil capacity - maximum 1.4 litre Oil capacity - minimum 0.9 litre Recommended oil (supplied) Ultragrade 19

Product Description	Order No.
E1M18 ATEX 115V, 1-ph, 60Hz Ex II 2G IIC T4 External	A34318986
E1M18 ATEX 115V, 1-ph, 60Hz Ex II 2G IIB T4 External	A34318987
E1M18 ATEX 230V, 1-ph, 60Hz Ex II 2G IIB T4 External	A34318988
E1M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIC T4 External	A34318989
E1M18 ATEX 230V, 1-ph, 60Hz Ex II 2G IIC T4 External	A34318990
E1M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIB T4 External	A34318991
E1M18 ATEX 400V, 3-ph, 50Hz Ex II 2G IIC T4 External	A34318992
E1M18 ATEX 400V, 3-ph, 50Hz Ex II 2G IIB T4 External	A34318993
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIC T4 Exernal	A36318986
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIB T4 Exernal	A36318987
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIB T4 Exernal	A36318988
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIC T4 Exernal	A36318989
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIC T4 Exernal	A36318990
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIB T4 Exernal	A36318991
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIC T4 Exernal	A36318992
E2M18 ATEX 230V, 1-ph, 50Hz Ex II 2G IIB T4 Exernal	A36318993

The table shows current data and suggests a suitable fuse rating. Starting current is drawn for less than one second and slow blow fuses should be used to prevent unnecessary rupture during starting. Pump outfits are rated for operation above 12°C. Pump starting at temperatures lower than 12°C will increase the current drawn due to the higher start torque required. This may cause the motor thermal overload to trip.

Three-phase motors should be protected by a starter consisting of a suitably rated contactor and thermal overload. The trip current regulator on the thermal overload should be set according to the starter manufacturer's instructions.

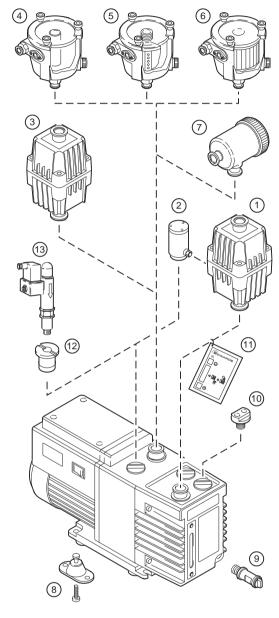
otario manaraotaro o mo	Full Load Current (A)		Start Current (A)		Suggested Fuse Rating
Electrical Supply	50 Hz	60 Hz	50 Hz	60 Hz	(A)
Speedivac 2					
220-240 V 1-ph 50 Hz	2.2		17.2		10
105-115 V 1-ph 50/60 Hz		4.8		24	10
E2M0.7					
220-240 V 1-ph 50/60 Hz	1.0	1.0	2.8	2.3	6
100-120 V 1-ph 50/60 Hz	1.8	1.9	5.7	5.3	10
E2M1.5					
220-240 V 1-ph 50/60 Hz	1.4	1.3	5.5	5.2	6
100-120 V 50/60 Hz	3.1	2.6	12.0	11.2	10
RV3 and RV5					
220-240 V 1-ph 50 Hz	2.4		15.6		5
230-240 V 1-ph 60 Hz		2.2		15.2	5
110 V 1-ph 50 Hz	4.6		29.4		10
115-120 V 1-ph 60 Hz		4.4		31.5	10
200-220 V 3-ph 50 Hz	1.7		10.2		2.5
200-230 V 3-ph 60 Hz		1.7		10.2	2.5
380-415 V 3-ph 50 Hz	1.0		5.7		2.5
460 V 3-ph 60 Hz		1.0		7.0	2.5
RV8 and RV12					
220-240 V 1-ph 50 Hz	4.0		18.0		5
230-240 V 1-ph 60 Hz		3.6		18.0	5
110 V 1-ph 50 Hz	7.8	0.0	34.0		13
115-120 V 1-ph 60 Hz	7.0	7.2	01.0	34.0	13
200-220 V 3-ph 50 Hz	2.5		14.0	01.0	4
200-230 V 3-ph 60 Hz		2.9		12	4
380-415 V 3-ph 50 Hz	1.5	2.0	9.0		2.5
460 V 3-ph 60 Hz		1.5	0.0	8.7	2.5
E1M18/E2M18		1.0		0.,	2.0
100 V	12		88		30
110-120 V	11	10	42	32	30
200-210 V	6	5.5	44	44	15
230 V	4.6	5	33	33	15
200-230 V 3-ph	4.0	2.3	00	15.9	10
380-415 V 3-ph	1.9	2.0	10.2	10.5	6
460 V 3-ph	1.5	1.6	10.2	10.6	6
E2M28		1.0		10.0	O
100 V	12		80		30
110-120 V	12	12	80	50	30
200-210 V	6	6.5	27	32	30 15
230 V	6				
230 V 200-230 V 3-ph	υ	6.5 3.9	27	32	15 16
•	2.2	ა.ყ	1/1 2	22	
380-415 V 3-ph	2.3	2.2	14.3	140	10
460 V 3-ph		2.3		14.6	10

Minimum starting voltage is 10% below lowest nominal voltage.

These fuse ratings are for indication only. The relevant instruction manual should be checked

before use.

This diagram shows the accessories available for oil-sealed pumps. Refer to the following pages for details of each accessory. Note that the E-LAB2 pump is supplied with all required accessories.



- Outlet mist filter*
- Oil return kit† Small volume inlet liquid catchpot
- ITO20K inlet liquid catchpot ITC20K inlet chemical trap
- ITF20K inlet dust filter FL20K foreline trap
- Vibration isolators
- Oil drain kit‡ OB20 oil box purge adaptor 10
- Oil change reminder card RV gas ballast adaptor**
- EBV20 solenoid operated gas ballast
- EMF filter shown
- RV adjustable gas ballast oil return kit shown
- RV pump extension kit shown
- ** Not required for EM pumps

Outlet Mist Filters

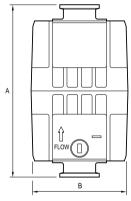
Benefits of the mist filter include:

- · Protection from oil mist emissions as required by COSHH and health and safety regulations
- · Use of optional oil return kits results in reduced oil level maintenance and savings in pump oil
- If the oil element becomes blocked, an integral pressure relief valve opens

EMF Filters The EMF3, EMF10 and EMF20 mist filters are suitable for all small rotary vane pumps up to E2M18. (The EMF20 can be used with an E2M28 on low pressure/throughput applications; contact Edwards). They are very efficient at 99.999% DOP test and are also azide proof. The white bottom half of the body is semitransparent, allowing the oil level to be monitored. The EMF filters have a unique odor element which neutralizes the smell of oil mist. MF30 FIlter The MF30 is suitable for E2M28 pumps. It is very efficient at 99.85% DOP test. You can monitor the oil level through the sightglass provided.

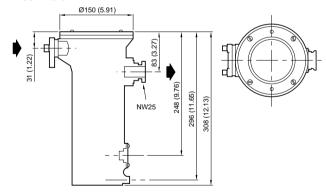
Dimensions

EMF Filters



	_	_	
	Α	B Square	Inlet/ Outlet
EMF3	128 mm / 5.03 inch		NW10
EMF10	171 mm / 6.73 inch	•	NW25
EMF20	191 mm / 7.51 inch		NW25

MF30 Filters



Ordering Information

Product Description	Order No.
Model EMF3 mist filter (0.315 kg)*	A46220000
Model EMF10 mist filter (0.500 kg) [†]	A46226000
Model EMF20 mist filter (0.700 kg) [†]	A46229000
Model MF30 mist filter (1.30 kg) [‡]	A46233000

- Supplied with NW10 clamp, centering ring and O-ring, NW10 to ¼ inch BSP adaptor. Supplied with NW25 clamp, centering ring and O-ring, NW25 to ¼ inch BSP adaptor. Supplied with NW25 elbow, NW25 clamp, NW25 to ¼ inch BSP adapter and NW25 Co-

Spares	Order No.
Odor element (pack of 5)	
EMF3	A22304081
EMF10	A22304079
EMF20	A22304077
Oil element	
EMF3	A22304197
EMF10	A22304198
EMF20	A22304199
MF30	A22304057
Body seal	
EMF3	A27159538
EMF10	A27159535
EMF20	A27159534

Oil Return Kits

Oil return kits These conserve the pump oil, by returning the oil trapped in the mist filter to the pump. The gas ballast oil return kit, for example, allows extended operation of the pump with gas ballast.

Product Description	Order No.
Clean application oil return kit (RV, Speedivac 2 to E2M0.7, E2M1.5)	A50419000
Adjustable gas ballast oil return kit (RV)	A50523000
Clean application oil return kit (E1M18 to E2M28)	A50420000

Inlet Liquid Catchpots

These catchpots minimize the entry of condensable vapors into the pump. Benefits of the catchpots include:

- Capture condensable vapors, which would otherwise condense in the pipelines or in the pump
- · Prevents froth or spray from the process from carrying over to the
- Corrosion-resistant body
- · Visual indication of trapped liquid level
- Hand-tightened drain plug, for easy drainage

Ordering Information

Product Description	Order No.
ITO20K inlet catchpot, 1.84 liters capacity, weight 3.2 kg	A44110000
Small volume inlet catchpot 0.1 liter capacity, weight 0.3 kg	A44105000

Both supplied with NW25 clamp, centering ring and O-ring.

ITC20K Inlet Chemical Traps

The ITC series of chemical traps provides the following benefits:

- Protection against various aggressive vapors, which may attack the pump or pump oil
- Prevent high molecular weight vapors (such as might arise in a resin treatment plant), from reaching the pump. These vapors could cause lacquering or clogging
- The standard sorbent (activated charcoal), has relatively high trapping properties (absorbs around 25% of its own weight), even when large amounts of water vapor are being pumped
- When filled with activated alumina on two-stage pumps, backstreaming of pump oil can be controlled
- · See also ITO catchpots for design advantages of the body

Ordering information

Product Description	Order No.
ITC20K inlet chemical trap charcoal charge 0.4 kg, weight 3.5 kg	A44410000
Sorbent charge not supplied. Supplied with NW25 clamp, centering ring and O-ring.	
Spares	Order No.
0.5 kg activated charcoal	H12205001
3 kg activated charcoal	H12205002
0.45 kg activated alumina	H02600050
0.2 kg activated alumina	H02600056

ITF20K Inlet Dust Filter

The ITF inlet dust filters prevent the entry of dust particles into the pump. The impedance of a clean filter reduces the pumping speed of a 20 m³h⁻¹ pump by about 20% at 1 mbar and 25% at 10 mbar.

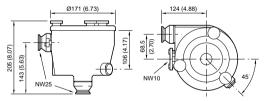
Depending on your application, you can normally clean the filter element with a vacuum cleaner or a clean air blast, and then re-use the element.

The benefits of the ITF filters include:

- Thick aluminum casting, to withstand abrasion
- Tangential entry port, to promote centrifugal separation of dust particles
- Filter efficiency better than 96% (tested to BS2831, dust number 2).

Dimensions

ITO20K, ITC20K and ITF20K



Ordering Information

Product Description	Order No.
ITF20K inlet dust filter (3.4) kg	A44215000
ITF20K element and gasket kit (0.3 kg)	A44201800

EBV Gas Ballast Control Valves

Fit the EBV 20 valve to allow remote operation of the pump's gas ballast control.

Ordering Information

Product Description	Order No.
EBV20 110 V 1-ph 50/60 Hz	A50006984
EBV20 (0.5 kg) 220 - 240 V 50/60 Hz	A50006930
Suits the E2M0.7 to E2M28 including RV.	
For RV and XDS pumps an adaptor is required	A50502000
For the E1M18/E2M28 an adapter is required	A50006003

Power Cables

Select the correct cable for your product and country.

Power Cables for E2M0.7 and E2M1.5, RV Pumps and XDS5 and XDS10 Pumps, 1 Phase

Pump end connector is EN60320 C13.

Ordering Information

Product Description	Order No.
UK, three pin plug, 2 m	A50505000
North European plug, 2 m	A50506000
North America/Japan plug, 2 m	A50507000
No plug, 2 m	A50508000

Power Cables for EM18, 28 and XDS35i Pumps, 1 phase

Pump end connector is IEC60320 C19.

Ordering Information

Product Description	Order No.
UK, three pin plug, 2 m	A50505003
North European plug, 2 m	A50506003
North America/Japan plug, 2 m	A50507003
No plug, 2 m	A50508003

FL20K Foreline Trap

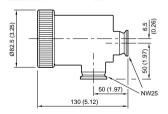
The FL20K foreline trap has been developed for use in clean pumping systems, to prevent the back-migration of rotary pump oil mist into the system. The activated alumina sorbent has the following benefits:

- · Exceptional trapping properties for oil mist (99.7%)
- · A very long life before it is saturated
- Can be rejuvenated by baking the basket containing the sorbent for 2 hours at 250 °C – 300 °C.

The FL20K is most useful with two-stage rotary pumps, operating below 1 mbar. To maximize sorbent life, install the FL20K near the vacuum system. In common with other types of sorbent, activated alumina absorbs water. This does not affect the oil vapor trapping properties but may tend to prolong the roughing time on successive pump downs. To minimize vapor absorption, we recommend you fit a valved by-pass line.

The trap body is made of aluminum and is fitted with a removable basket containing the sorbent.

Dimensions



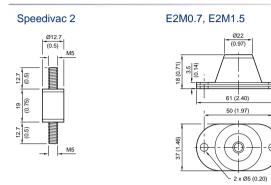
Product Description	Order No.
FL20K foreline trap (Supplied with 0.2 kg sorbent charge)	A13305000
Sorbent charge 0.1 kg, weight 1.0 kg	
By-pass valve	C07902000
Spares	Order No.
0.45 kg activated alumina	H02600050
0.2 kg activated alumina	H02600056

Vibration Isolators

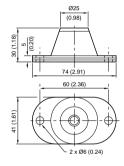
You may need to fit vibration isolators to your pump if you mount it into a frame or a system, if the mounting points are not level or if you need to minimize the transmission of vibration and noise in your application. You must fit flexible bellows or other flexible pipes to the pump inlet and outlet.

The height of the isolators reduces by about 1 mm when the pump is

Dimensions



RV Pumps, E1M18/E2M18, E2M28, XD5/10 and XDS35i



Ordering Information

Product Description	Order No.
Vibration isolators	
Speedivac 2 (0.1 kg)	A24801403
E2M0.7, E2M1.5 (0.3 kg)	A24801407
RV, E1M/E2M18, XDS (0.45 kg)	A24801404
E2M28 (0.45 kg)	A24801412
XDS35i (0.45 kg)	A24801408

Oil Box Drain Kits

Two kits are available:

- RV easy oil box drain kit. This kit includes an oil drain extension tube for use when the oil is gravity drained. Fits E2M0.7, E2M1.5, RV, E1M18, E2M18, E2M28.
- ODP20, for use with the E1M18, E2M18 and E2M28 pumps. This accessory provides alternative methods for draining oil where access to the pump drain plug is difficult, or where there is no room for a receptacle under the drain outlet. The pack includes an oil drain extension tube for use when oil is gravity drained, and a pressure drain device with which the oil can be discharged at a high

Ordering Information

Product Description	Order No.
RV easy oil box drain kit	A50503000
ODP20 oil box drain kit	A50002000

Exhaust Silencers

For use on XDS pumps that are not connected to a house exhaust system. These silencers also offer exhaust filtration.

Ordering Information

Product Description	Order No.
Exhaust silencer	
XDS5/10	A50597000
XDS35i	A50597001

OB20 Oil Box Purge Adaptor

This stainless steel adaptor enables a flow of dry inert gas to be introduced into the oil box to provide large scale dilution of process gases which cannot be dealt with sufficiently by the standard gas ballast facility. The adaptor replaces the oil filler plug, on the RV and E1M18/E2M18 pumps only.

Ordering Information

Product Description	Order No.
OB20 oil box purge adaptor	A50034000

Oil Change Reminder Tag

The oil change reminder tag is a useful reminder for users to change the oil when it starts to go brown. Brown oil indicates that the oil is contaminated or degraded, and must be changed to prevent mechanical wear or failure of the pump. Tie the tag onto the pump exhaust so that it hangs over the oil box.

Ordering Information

Product Description	Order No.
Oil change reminder tag (pack of 10)	A20003017

Water Jet Pump 0.23 m³h⁻¹

Fits laboratory tap and ordinary water supply for simplest production of rough vacuum for distillation, filtration, aeration etc. An integral non-return valve prevents system flooding from fluctuating water pressures.

Technical Data

Material of construction	Corrosion resistant plastic equivalent to stainless steel
Recommended water pressure	1.4 bar / 20 lbs inch ⁻¹
Operational water temperature	15°C / 59°C
Pumping speed (air)	0.23 m ³ h ⁻¹ – 3.9 l min ⁻¹
Ultimate vacuum	16 - 19 mbar / 12-14.25 Tor
Time to evacuate volume of 5 liters down to 60 mbar	3 min approx
Water consumption	625 I h ⁻¹ / 2.75 G min ⁻¹
Connections	
Water	12 mm tubing
Vacuum	riffled to suit 7 mm bore tubing
Drain	3/4 inch (9.5 mm) tubing
Weight	34 g
Size	60 W x 110 L / 2.5 inch x 4.3

Ordering Information

Product Description	Order No.
Water jet pump	C41001000
Fluoroelastomer ball/pin assembly for non-return valve	C03901010

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E-Lab 2 Two Stage Rotary Vane Pump



1

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The E-LAB 2 pump includes all the components needed for laboratory applications such as wet chemistry and sample preparation. Based on Edwards proven past experience with vacuum pumps and developments in accessories, the E-LAB 2 pump allows continuous running, even in the presence of water and solvents.

Supplied with: Outlet mist filter, oil return kit, inlet trap, oil change tag, nozzles, elbow, all fittings, 1 litre of oil and instruction manual. Assembly necessary.

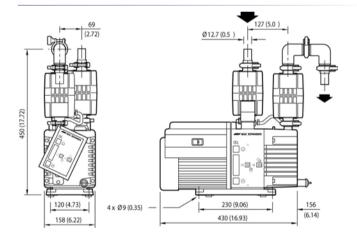
Features & Benefits

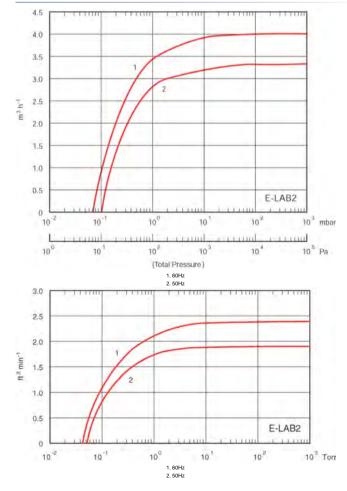
- The E-LAB 2 pump includes all the components needed for laboratory applications such as wet chemistry and sample preparation.
- One part number covers all the package easy to order and setup.
- Unique high performance pump
- Pumping speed and ultimate vacuum superior to diaphragm pumps
- Good water vapour handling

Applications

- Rotary evaporators
- · Centrifugal concentrators
- Vacuum ovens
- Distillation/extraction apparatus
- Fume hoods/glove boxes

Dimensions





Displacement	
50Hz operation	$3.7 \mathrm{m}^3 \mathrm{h}^{-1} / 2.3 \mathrm{ft}^3 \mathrm{min}^{-1}$
60Hz operation	$4.5 \mathrm{m}^3 \mathrm{h}^{-1} / 2.6 \mathrm{ft}^3 \mathrm{min}^{-1}$
Speed (Pneurop 6602)	
50 Hz operation	$3.3 \mathrm{m}^3 \mathrm{h}^{-1} / 1.9 \mathrm{ft}^3 \mathrm{min}^{-1}$
60 Hz operation	$3.9 \mathrm{m}^3 \mathrm{h}^{-1} / 2.3 \mathrm{ft}^3 \mathrm{min}^{-1}$
Ultimate vacuum (total pressure)	1 x 10 ⁻¹ mbar / 7.6 x 10 ⁻² Torr
Inlet/Outlet connection	1/2 inch id hose adaptor
Maximum allowed outlet pressure	1 bar gauge / 14 psig
Maximum allowed inlet pressure	0.5 bar gauge / 7 psig
Maximum water vapor inlet pressure	40 mbar / 30 Torr
Maximum water vapor pumping rate	95 g h ⁻¹
Mist filter oil trap efficiency	99.999%
Motor power 50/60Hz	450/550 W
Electrical supply	110-120 V or 220-240 V, 50 or 60 Hz
Operating temperature range	12 - 40 °C
Weight, pump only, without oil	25 kg / 55 lbs
Noise	50 dB(A) @ 50 Hz
Oil capacity	
Maximum	0.7.14
Maximum	0.7 liter
Minimum	0.42 liter

Ordering Information	
Product Description	Order No.
E-Lab 2 115/230V, 1-ph, 50/60Hz, Factory set to 230V	A65207903
E-Lab 2 115/230V, 1-ph, 50/60Hz, Factory set to 115V	A65207906
Accessories & Spares	Order No.
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A50505000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
Spares Kit RV3/5/8/12	A65201131
Blade Kit RV3	A65201130
Spares Kit Outer Shaft Seal Kit RV	A65201134
Spares Kit Inlet Valve RV3/5/8/12	A65201036
Filter Oil Element EMF10	A22304198
Odour Removal Element EMF10 Pk5	A22304079

D-LAB Diaphragm Vacuum Pump



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The D-LAB membrane pumps with their chemically resistant Teflon heads, diaphragms and Kalrez valves offer the chemical or pharmaceutical laboratory user a wide range of choice, either used as stand-alone pumps or as part of a sophisticated system.

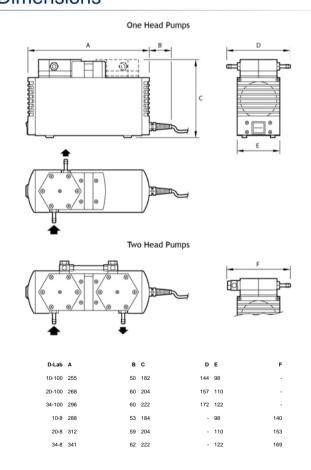
The one head, 100 mbar ultimate vacuum pumps are suitable for use with drying equipment or for replacing water-jet pumps, whilst the two head, 8 mbar ultimate vacuum pumps are suitable for rotary evaporation, gas transfer and a wide range of medium vacuum applications.

Information show is for D-LAB 10-100, for information on range please refer to our website.

Features & Benefits

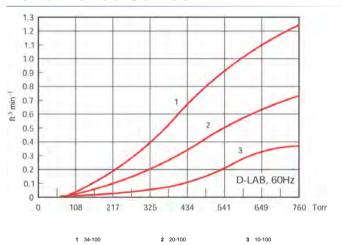
- Teflon heads and diaphragms
- One and two head versions
- 3 Sizes
- Compact, space-saving design
- Low noise

Dimensions



Applications

- Rotary evaporation
- · Gel drying
- Vacuum desiccation
- Vacuum filtration
- Vacuum degassing



Technical Data

Pumping speed (air)	
10-100, 10-8	0.6 m ³ h ⁻¹ , 10 lmin ⁻¹
20-100, 20-8	1.2 m ³ h ⁻¹ , 20 lmin ⁻¹
34-100, 34-8	2 m h , 34 lmin -1
Ultimate vacuum	
10-100, 20-100, 34-100	100 mbar 50Hz, 75 mbar 60Hz
10-8, 20-8, 34-8	8 mbar 50Hz, 6 mbar 60Hz
Inlet and outlet connection	Riffled nozzle, suitable for 9 mm i.d. hose
Maximum inlet pressure	1 bar
Motor power and current	
10-100, 100V 60Hz	110 W 1.3 A
10-100, 220-240V 50Hz	100 W 0.6 A
20-100, 110V 60Hz	145 W 1.9 A
20-100, 220-240V 50Hz	130 W 0.9 A
34-100, 110V 60Hz	220 W 3.2 A
34-100, 220-240V 50Hz	180 W 1.4 A
10-8, 100V 60Hz	110 W 1.3 A
10-8, 220-240V 50Hz	90 W 0.6 A
20-8, 110V 60Hz	130 W 1.2 A
20-8, 220-240V 50Hz	120 W 0.9 A
34-8, 110V 60Hz	250 W 3.2 A
34-8, 220-240V 50Hz	200 W 1.5 A
Enclosure rating	IP44
Operating temperature	5 - 40 °C
Weight	
10-100	5.8kg / 12.8lbs
20-100	7.1kg / 15.6lbs
34-100	10.3kg / 22.7lbs
10-8	6.9kg / 15.2lbs
20-8	9.3kg / 20.5lbs
34-8	12.6kg / 27.7lbs

Product Description	Order No.
D-LAB 10-100, 110V, 60Hz, 1-ph	A48015941
D-LAB 10-100, 220 –240, 50Hz, 1-ph	A48015960
D-LAB 20-100, 110V 60Hz, 1-ph	A48017941
D-LAB 20-100, 220- 240~ 50Hz, 1-ph	A48017960
D-LAB 34-100, diaphragm pump, 110~ 60Hz, 1-ph	A48021941
D-LAB 34-100, 220- 240~ 50Hz, 1-ph	A48021960
D-LAB 10-8, 110 V 1-phase 60 Hz	A48016941
D-LAB 10-8, 220 -240~ 50Hz, 1-ph	A48016960
D-Lab 20-8, 110 V 1-phase 60 Hz	A48018941
D-Lab 20-8, 220-240V 50Hz, 1-ph	A48018960
D-LAB 34-8, diaphragm pump, 110V 60Hz, 1-ph	A48022941
D-LAB 34-8, diaphragm pump, 220-240 V 1-phase 50 Hz	A48022960
Accessories & Spares	Order No.
D-Lab Base Plate 10+20-X	A48015134
Baseplate For D-Lab Pumps 34-100,34-8.	A48021134
D-Lab Separator	A48015136
Condenser For D-Lab Pumps	
Condenser For D Lab Fullips	A48015137
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug	A48015137 A50505000
2m electrical supply cable for 1-ph pumps, UK,	
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps,	A50505000
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no	A50505000 A50506000
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug	A50505000 A50506000 A50508000
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8	A50505000 A50506000 A50508000 A48015135
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8 D-Lab Gas Ballast 20+34-8	A50505000 A50506000 A50508000 A48015135 A48017135
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8 D-Lab Gas Ballast 20+34-8 D-Lab Controller 230V	A50505000 A50506000 A50508000 A48015135 A48017135 A48015138
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8 D-Lab Gas Ballast 20+34-8 D-Lab Controller 230V D-Lab Controller 100/110V	A50505000 A50506000 A50508000 A48015135 A48017135 A48015138 A48015139
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8 D-Lab Gas Ballast 20+34-8 D-Lab Controller 230V D-Lab Controller 100/110V Service kit for D-LAB 10-100	A50505000 A50506000 A50508000 A48015135 A48017135 A48015138 A48015139 A48015815
2m electrical supply cable for 1-ph pumps, UK, Three-pin plug 2m electrical supply cable for 1-ph pumps, North European plug 2m electrical supply cable for 1-ph pumps, no plug Gas Ballast For D-Lab Pumps 10-100,10-8 D-Lab Gas Ballast 20+34-8 D-Lab Controller 230V D-Lab Controller 100/110V Service kit for D-LAB 10-100 Spares Kit D-Lab 20-100	A50505000 A50506000 A50508000 A48015135 A48017135 A48015138 A48015139 A48015815 A48017815
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XDD1 Diaphragm Vacuum Pump



1

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The Edwards XDD1 diaphragm pumps are used for backing small compound turbomolecular pumps in clean, high vacuum applications. They comply with EN61010 and EN1012, and are designed to be free standing bench top units. For 2010 the old models have been replaced with CSA/UL compliant ones.

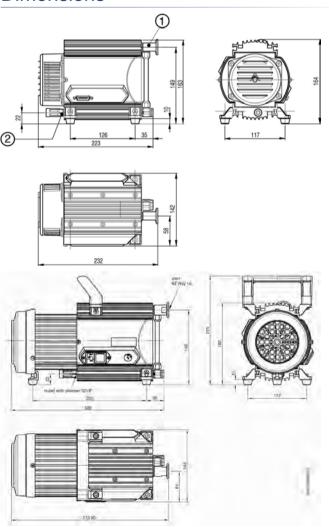
The a.c. voltage motor can be used on worldwide supplies ranging from 100 to 115 V, and 200 to 230 V (200 to 230V is the default setting). The pump has both an on/off and voltage changeover switch. The power is connected through a standard EN60320 socket.

The d.c. voltage motor runs on 24 V via a 15 pin DIN connector. By selecting the

Features & Benefits

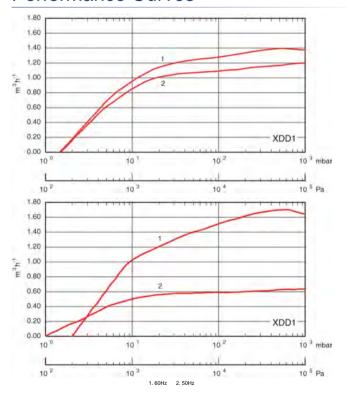
- Dry pumping, oil free turbomolecular backing pump with no oil disposal issues
- · Compact and lightweight with a small footprint
- Worldwide a.c. voltage or 24 V d.c.
- On/off switch
- EN 60320 connector on AC pumps

Dimensions



Applications

- RGA
- · Mass spectrometers
- Cryostat and Dewar evacuation
- Ion pump evacuation
- Surface science



Pumping Speed	
a.c.	1.2 m ³ h ⁻¹ 50Hz, 1.5 m ³ h ⁻¹ 60Hz
d.c.	0.6 m ³ h ⁻¹ 600 rpm, 1.6 m ³ h ⁻¹ 2200rpm
Ultimate vacuum (typical)	<2 mbar
Ambient temperature limit	10 to 40 °C
Inlet connection	NW16
Exhaust connection	The pump is fitted with a silencer which can be removed and an exhaust line connected with a 1/8" BSP fitting
Max allowed inlet pressure	1 bar Abs
Motor power	
a.c.	80 W
d.c.	64 W
Weight	
a.c.	6.5 kg
d.c.	4.1 kg

Product Description	Order No.
XDD1 Diaphragm Pump 100-115V/200-230V 50/60 Hz	A74602983
XDD1 Diaphragm Pump 24 V d.c.	A74602991
Accessories & Spares	Order No.
T-Lab Line Cord Set UK Plug 3A	A50516000
2m electrical supply cable for 1-ph pumps, North European plug	A50506000
2m electrical supply cable for 1-ph pumps, North America/Japan plug	A50507000
2m electrical supply cable for 1-ph pumps, no plug	A50508000
XDD/DX/EXDC Extension Cable 1m	D39700835
XDD/DX/EXDC Extension Cable 2m	D39700836
XDD/DX/EXDC Extension Cable 5M	D39700837
XDD1 diaphragm service kit	A74601800



Turbomolecular Pumps







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High Throughput STP Pumps	73
Advanced High Throughput STP Pumps	77
High Flow and High Throughput STP Pumps	85
STP Controllers	91

EXT Turbomolecular Pumps and Controllers



Our range of EXT turbomolecular and compound molecular pumps and EXC Controllers uses state-of-the-art technology to provide reliable, high and ultra high vacuum.

Key Performance Factors

A turbomolecular pump (TMP) is a multi-stage axial-flow turbine in which high speed rotating blades provide compression by increasing the probability of gas molecules moving in the pumping direction. The turbomolecular pump is optimized for molecular flow conditions and requires a suitably sized two stage rotary vane pump or an oil free scroll pump to exhaust to atmosphere.

A compound molecular pump (CMP) is based on the concept of combining bladed turbomolecular stages with molecular drag stages on the same rotor. This design allows:

- High critical foreline pressures (typically up to 10 mbar)
- Options to use smaller backing pumps or dry diaphragm backing pumps

Pumping Speed (volume flow rate) is determined by the rotor diameter, inlet flange size and rotational speed. The pumping speed reduces at high inlet pressures to a value determined by the size of the backing pump.

As the inlet pressure rises, the motor power dissipation and pump temperature increase. **Maximum continuous inlet pressure** sets the maximum throughput limit for steady state pumping and depends on the cooling method used. Above this pressure, the rotational speed of the pump reduces as temperature sensors limit the pump power. With a water-cooled pump, the actual **maximum throughput** depends on the size of the backing pump.

Quiescent Electrical Power is the nominal power dissipated by a pump operating normally at full rotational speed and with low gas throughput (inlet pressure below the 10⁻³ mbar range). During the run-up time, or when operating at high gas throughput or above the critical backing pressure, the pump power dissipation will rise and approach the maximum power output for the turbo Controller used. Critical backing pressure for conventional turbomolecular pumps is approximately 0.1 to 0.2 mbar.

Compression Ratio is determined by the rotational speed, the number of pump stages and the molecular weight of the pumped gas. It is higher for heavier gases which explains why the suppression of hydrocarbon backstreaming is so effective and why the ratio for hydrogen is important for ultra high vacuum applications.

Ultimate Pressure measured according to Pneurop standards, is the lowest pressure achieved in the test system, 48 hours after bakeout. The system is backed only by a two-stage rotary vane pump. Fluoroelastomer inlet seals are used with ISO-flanged pumps and metal seals are used with CF-flanged pump models.

Bearing and Suspension Technologies

We use two basic technologies: magnetic bearings and mechanical ceramic ball bearings.

Ceramic bearings, which are lubricated for life by either grease or oil, have replaced conventional steel bearings. The silicon nitride ceramic balls are lighter, harder and smoother than steel equivalents, leading to longer life and lower vibration characteristics. Reliability is increased because the ball and race materials are different, which prevents micro pitting.

Magnetic bearings further increase reliability. Our EXT turbomolecular pumps up to 540 l s⁻¹ use a hybrid bearing arrangement with a permanent magnet upper bearing and an oil lubricated ceramic lower bearing.

Rotor Technologies

We use two basic technologies:

- compound molecular and fluid dynamic (combining turbomolecular, drag and fluid dynamic stages)
- compound molecular (combining turbomolecular and drag stages)
 In addition, EXT pumps up to 540 l s⁻¹ use monobloc rotors machined from solid bar by computer controlled high speed milling machines.
 This technology produces stable, rigid rotors and allows virtually unlimited design flexibility for optimum vacuum performance.

Motor Technology

EXT pumps use brushless d.c. motors and are available in 24 and 80 volt variants. For the 24 volt pumps the TIC line of controllers are available with the added benefit of integrated instrument controllers. For the 80 volt pumps you can choose from our EXC line of controllers to optimize the performance and cost options for your application.

The Controllers incorporate a regenerative back-up supply which provides power in the event of electrical supply failure to keep the vent-valve closed for several minutes.



Ceramic ball bearings

Corrosive Applications

For maximum life and reliability in the exacting process conditions encountered in semiconductor wafer processing applications, we recommend that you use turbomolecular pumps from our Edwards STP-C and STPH-C series. These Maglev pumps have magnetic bearings and are ideal for these harsh duty applications.

Purge Port

The EXT pumps all have purge-ports which can be used to purge the motor and bearing cavity with an inert gas (such as nitrogen). We recommend that you purge the pump when you pump corrosive and abrasive gas mixtures or those with an oxygen content over 20%. You can use our PRX10 purge-restrictor to set the purge gas flow rate. This typically adds up to 25 sccm to the total gas load and the backing pump must be sized accordingly.

Venting

To maintain the cleanliness of your vacuum system, we recommend that you vent a turbomolecular pump at or above half rotational speed, when the rotor is still spinning fast enough to suppress any backstreaming of hydrocarbons from the backing line.

The vent port on the EXT pump is part way up the rotor stack to ensure maximum cleanliness even with fluoroelastomer sealed vent-valves. Each pump is supplied with a manual vent-valve. If you use this manual valve care must be taken not to open it too quickly, especially if the system volume is small (typically less than the approximate volume of the turbomolecular pump), because if the rate of pressure rise is too high, the pump bearing life may be reduced.

In a small volume system, the rate of pressure rise will be greater than in a large volume for a given vent flow rate, and it may be necessary to restrict the vent gas flow. We offer the VRX range of vent restrictors which you can fit to your EXT pump.

Since the rate of pressure rise cannot be accurately controlled by the manual vent-valve, we recommend that, unless you fit a suitable VRX restrictor to the vent port, you must wait until the turbomolecular pump has slowed down to 50% speed, as indicated by the controller, before you open the manual vent-valve.

The maximum rate of pressure rise varies by pump model, and the Instruction Manual supplied with an EXT pump gives further guidance on this, and the size of vent restrictor needed to meet the fastest pressure rise allowed.

Control of the rate of venting is particularly important with pumps using fully magnetic bearings, otherwise the safety bearings may be damaged.

The manual vent-valve can be replaced with a TAV solenoid valve driven by the Controller to allow venting after a 2 second delay on shut-off, or delaying vent until the rotational speed has dropped to 50%. The Controller can also control the TAV vent-valve in the event of power or pump failure.

You can choose from two solenoid vent-valve options; the TAV5 which covers most auto-venting applications, and the TAV6 which has a higher conductance than the TAV5 and is designed either for use on larger chambers (typically with a volume greater than 10 liters), or when you want to use a two-stage venting procedure for the fastest possible vent times.

For two-stage venting you need two TAV valves. By using the appropriately restricted flow for the first stage vent-valve you can start venting when the EXT pump is still at full rotational speed. Once the pump has slowed to half rotational speed you can then introduce higher flow rates from the second stage vent-valve.

Inlet-Screen

An inlet-screen is fitted as standard to all EXT pumps. The inlet-screen prevents debris from falling into the pump-inlet. In addition, the inlet-screen prevents you from coming into contact with the blades of the pump when it is disconnected from your vacuum system.

EXT75DX and EXT255DX also have the facility for pulsed venting to allow rapid yet controlled venting of a system.

Cooling

For most applications, we recommend that you use forced-air cooling with the appropriate ACX air-cooler connected to your EXT pump. NB: high gas load, high backing pressure and rapid cycling require more cooling.

However, if the ambient temperature is above 35 °C you must water-cool the EXT. The barbed connectors on the water-cooler are suitable for 6 mm internal diameter hose.

Water cooling reduces the running temperature of the pump motor and bearings and is particularly recommended when you operate the EXT with a continuous high throughput (that is, inlet pressure above 1 x 10^{-3} mbar) or when you bake the EXT pump to above 70 °C (measured at the inlet flange).

Water cooling accessories need to be purchased separately.

Scope of Supply

For end users desiring front panel controls and indications we suggest the following:

- TIC controller with EXT75DX and EXT255DX
- TIC controller with EXT406PX plus EXDC drive unit
- EXC300 controller with EXT556H and EXT to EXC cable

Each EXT pump is supplied with an inlet screen, elastomer or copper gasket inlet seal (as appropriate) and manual vent valve. Where required a water cooling accessory is available.

Turbo controllers require the appropriate mains cable to be selected

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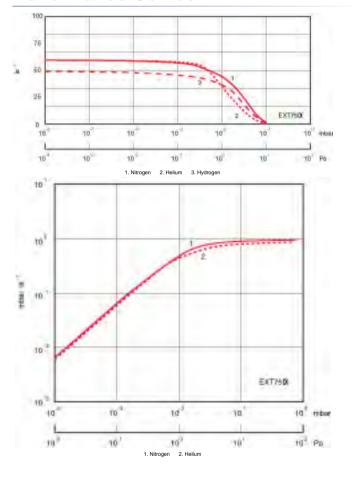
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The EXT75DX compound turbomolecular pumps combine the proven technology of a ceramic mechanical lower bearing, a dry permanent magnetic upper bearing and Holweck drag stage with the added convenience of an on-board 24V controller allowing parallel and serial communication compatible without TIC controllers.

Dimensions

A Manual vent valve in vent port B Podule C Logic interface connector D Backing port H Earth connection



2

Technical Data

Inlet flange	DN40NW,DN63ISO-K, DN63CF or DN100ISO-K
Pumping Speed	
N ₂ ISO63/63CF (DN40NW)(ISO100)	61 ls ⁻¹ (42 ls ⁻¹) (66 ls ⁻¹)
He ISO63/63CF (DN40NW)(ISO100)	57 ls ⁻¹ (49 ls ⁻¹) (59 ls ⁻¹)
H ₂ ISO63/63CF (DN40NW)(ISO100)	53 ls ⁻¹ (48 ls ⁻¹) (54 ls ⁻¹)
Compression ratio	
N_2	<1 × 10 ¹¹
He	1 x 10 ⁶
H_2	5 x 10 ⁴
Outlet flange	DN16NW
Recommended backing pump*	E2M0.7/XDD1/XDS5
Vent port	1/8 inch BSP
Purge port	1/8 inch BSP
Max continuous inlet pressure (light gas pumping) [†] Water cooling (water at 15 °C, ambient temp at 40 °C)	2 × 10 ⁻² mbar
Forced air cooled, 35 °C ambient	1 × 10 ⁻² mbar
Pump rotational speed	
Nominal rotational speed	90000 rpm
Standby rotational speed	Variable from49500 to 90000 rpm (63000 rpm default)
Programmable power limit settings	Variable from 50-120W (80W default)
Start time to 90% speed	110 s ‡
Analogue outputs	Rotational speed;Power consumption; Pump temp;

Forced air / water Cooling method?

Ambient air temperature for

forced air cooling

Min cooling water flow rate (water 15 °C)

Water temp range

10 - 20 °C Max inlet flange temp 100 °C

Vertical and upright, through to Operating attitude

Horizontal <50 dB(A)

Controller temp

5 - 35 °C

15 l h

Noise level at 1 metre Max magnetic field pump can

tolerate

5 mT

Recommended controller

TIC100 turbo and instrument

controller

Quiescent electrical power

10 W

Product Description	Order No.
EXT75DX DN63ISO-K	B72241000
EXT75DX DN63CF	B72242000
EXT75DX DN40NW	B72243000
EXT75DX DN100ISOK	B72245000
EXT75DX DN100ISO-K (DN25NW Backing)	B72246000
EXT75iDX Turbo Pump DN40NW	B72235000
EXT75iDX Turbo Pump DN63ISO-K	B72237000
EXT75iDX Turbo Pump DN63ISO-K (NW25 Interstage)	B72238000

A larger backing pump may be required for maximum throughput. A suitable diaphragm pump with ultimate <5 mbar may also be used.

Above this inlet pressure, rotational speed drops to below

T nominal.

‡ Power limit set to 80 W.

? Air and water cooling accessories must be ordered

EXT556H Compound Turbomolecular Vacuum Pump

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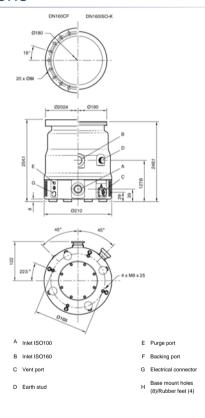
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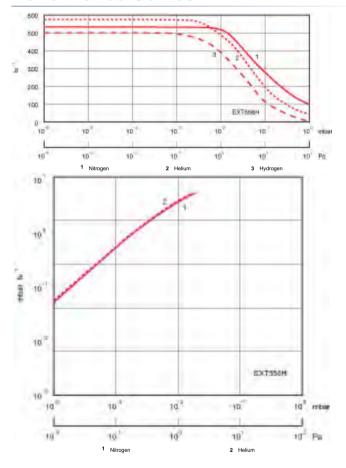


The EXT556H incorporates our hybrid bearing and enhanced molecular drag pumping technologies with turbomolecular pump stages on a single rotor. The result is a highly reliable pump well suited to applications requiring excellent light gas performance and ultimate pressures $<\!10^{-10}$ mbar. With the optional ferromagnetic envelope the EXT556H excels in applications, such as FTMS, where high magnetic fields are present.

The EXT556H can be used in conjunction with EXC300, EXC250 and EXDC160 (80V) controllers.

Dimensions





B58051008

Technical Data

Main Inlet flange	DN160ISO-K
Outlet Flange	DN25NW
Vent port	¹ / ₈ inch BSP
Purge port	¹ / ₈ inch BSP
Inlet pumping speed*	
N_2	540 l s ⁻¹
He	580 s ⁻¹
H_2	500 l s
Ar	510 l s ⁻¹
Compression ratio	31015
N ₂	<10 ¹⁰
He	10
H ₂	
_	10
Ar	<10 ¹⁰
Ultimate Pressure (CF variant)	<10 ⁻¹⁰ mbar
Recommended backing pump	RV12
Max continuous inlet pressure (N2, He, H2)**	
forced air cooled, 30 °C ambient	1 x 10 ⁻³ mbar
forced air cooled, 35 °C ambient	5 x 10 ⁻⁴ mbar
water cooling at 15 °C	2 x 10 ⁻³ mbar
Nominal rotational speed	50000 rpm
Start time to 90% speed	
EXC250	5 min
EXC300	6.5 min
EXDC160	8 min
Cooling method	Forced air/water
Ambient air temp for forced air cooling	0 °C - 35 °C
Recommended cooling water flow rate (water at 15°C)	15 l h ⁻¹
Water temp range	10 - 20 °C
Max inlet flange temp	80 °C
Operating attitude	Vertical and upright, through to horizontal
Noise level at 1 metre	<60 dB(A)
Max magnetic field	
Axial	<7 mT
Radial	<3 mT
Recommended controller	EXC250, EXC300
Quiescent power consumption	35 W

^{*} Measured without inlet screen. Inlet screens are supplied fitted and may reduce speed by up to 20% ** With backing pressure <0.3 mbar. Above this inlet pressure rotational speed drops

Ordering Information Product Description Order No. EXT556H DN160ISO-K B77751000 EXT556H DN160CF B77752000 EXT556H DN160ISO-K (Martensitic envelope) B77757000 B77758000 EXT556H DN160CF (Martensitic envelope) EXT556H DN160ISO-K (Fine inlet screen) B77761000 Order No. **Accessories & Spares** ACX555H Air Cooler B58053561 Water Cooler Kit WCX555H B58067003 DN160CF/8 Copper Gasket Pk 5 C10011290 B27158074 ISO160 Coseal Viton ISX inlet-screen - ISHX160/8C B58051007

ISX inlet-screen - ISHX160/8F

nEXT240D Turbomolecular Pump

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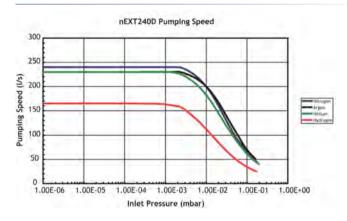


The nEXT240D is a hybrid bearing compound turbopump that replaces the EXT255H and EXT255DX series of pumps. It is available with either an ISO100 or a CF100 inlet flange and has a N₂ pumping speed of 240l/s. nEXT pumps build on our previous products maintaining the proven bearing technology (oil lubricated ceramic lower bearing with dry permanent magnetic upper bearing), whilst adding an improved rotor design with a new molecular drag stage to deliver improved pumping speed and compression ratios, and true user serviceability. They feature 24V to 48Vdc sensorless motors with a built in drive that is fully compatible with those on our DX pumps and our range of TIC controllers.

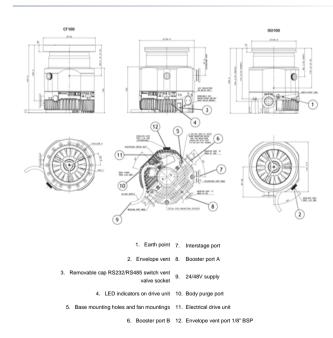
Features & Benefits

- State-of-the-art rotor design enhances performance to deliver exceptional pumping speeds and compression ratios
- Fully end user serviceable in minimum time without complex tooling or major disassembly...you can do it!
- Compact design with high performance for efficient systemisation
- Compatible with Edwards TIC turbo and instrument controllers meaning you can add up to 3 vacuum gauges without the need of an additional gauge controller
- RoHS compliant and CSA/UL approved

Performance Curves



Dimensions



Product Description	Order No.
nEXT240D Turbomolecular Pump ISO100 Inlet Flange	B81200100
nEXT240D Turbomolecular Pump CF100 Inlet Flange	B81200200
Accessories & Spares	Order No.
TIC Controller	D39722000
nEXT Radial Fan	B58053175
nEXT Radial Fan with Connector for Pump Drive	B58053170
nEXT Water Cooling Kit	B80000815
Oil Cartridge Tool Kit	B80000812
Bearing Tool Kit	B80000805
Oil Cartridge	B80000811
Bearing and Oil Cartridge	B80000810

Technical Data

Inlet flange DN100ISO-K, DN100CF Pumping speed

 N_2 240 ls⁻¹ 230 ls⁻¹ He H_2 165 ls⁻¹

Compression ratio

 N_2 <1 x 10¹¹ 3 x 10⁵ He H_2 1 x 10⁴ DN25NW Outlet flange RV12/XDS10 Recommended backing pump* Vent port 1/8 inch BSP female Purge port 1/8 inch BSP female

Max continuous inlet flow

(Nitrogen)[†]

Water cooling (water at 15°C, ambient temp at 40°C)

Forced air cooled, 35 °C

ambient

Pump rotational speed

Nominal rotational speed 60000 rpm

Variable from 33000 to 60000 Standby rotational speed rpm (42000 rpm default)

Variable from 50-200W (160W Programmable power limit

settings

default)

45 sccm

30 sccm

Start time to 90% speed 125s

Pump rotational speed; Power Analogue outputs consumption; Pump temp;

Controller temp Forced air / water

Cooling method?

Ambient air temp for forced air

cooling

5 - 35°C

Min cooling water flow rate

(water 15°C)

15 l h

Water temp range 10 - 20°C Max inlet flange temp 75°C

Vertical and upright, through to Operating attitude Horizontal +/- 2º

<45 dB(A)

Noise level at 1 metre Max magnetic field pump can

tolerate

5 mT

TIC200 turbo and instrument Recommended controller

controller

Quiescent electrical power Typically 20W

nEXT300D Turbomolecular Pump

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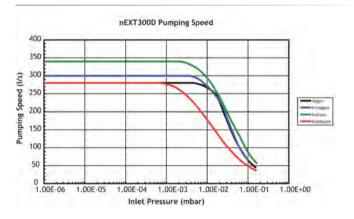


The nEXT300D is a hybrid bearing compound turbopump that replaces the EXT406PX ISO100 pump. It is available with either an ISO100 or a CF100 inlet flange and has a $\rm N_2$ pumping speed of 300l/s. nEXT pumps build on our previous products maintaining the proven bearing technology (oil lubricated ceramic lower bearing with dry permanent magnetic upper bearing), whilst adding an improved rotor design with a new molecular drag stage to deliver improved pumping speed and compression ratios, and true user serviceability. They feature 24V to 48Vdc sensorless motors with a built in drive that is fully compatible with those on our DX pumps and our range of TIC controllers.

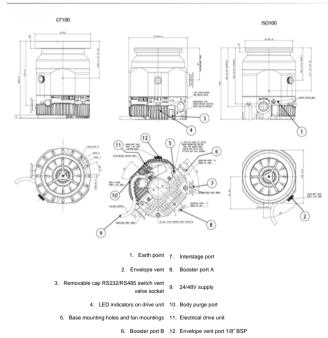
Features & Benefits

- State-of-the-art rotor design enhances performance to deliver exceptional pumping speeds and compression ratios
- Fully end user serviceable in minimum time without complex tooling or major disassembly...you can do it!
- Compact design with high performance for efficient systemisation
- Compatible with Edwards TIC turbo and instrument controllers meaning you can add up to 3 vacuum gauges without the need of an additional gauge controller
- RoHS compliant and CSA/UL approved

Performance Curves



Dimensions



Product Description	Order No.
nEXT300D Turbomolecular Pump ISO100 Inlet Flange	B82200100
nEXT300D Turbomolecular Pump CF100 Inlet Flange	B82200200
Accessories & Spares	Order No.
TIC Controller	D39722000
nEXT Radial Fan	B58053175
nEXT Radial Fan with Connector for Pump Drive	B58053170
nEXT Water Cooling Kit	B80000815
Oil Cartridge Tool Kit	B80000812
Bearing Tool Kit	B80000805
Oil Cartridge	B80000811
Bearing and Oil Cartridge	B80000810

Technical Data

Inlet flange DN100ISO-K, DN100CF

Pumping speed

 $${\rm N}_2$$ $$300~{\rm Is}^{-1}$$ He $$340~{\rm Is}^{-1}$$ ${\rm H}_2$ $$280~{\rm Is}^{-1}$$

Compression ratio

 N_2 $<1 \times 10^{11}$ He 1×10^6 H_2 5×10^4 Outlet flange DN25NW
Recommended backing pump* RV12/XDS10
Vent port 1/8 inch BSP female
Purge port 1/8 inch BSP female

Max continuous inlet flow

(Nitrogen)[†]

Water cooling (water at 15°C, ambient temp at 40°C)

Energy of the second of the se

Forced air cooled, 35 °C

ambient

Pump rotational speed

Nominal rotational speed 60000 rpm

Standby rotational speed Variable from 33000 to 60000 rpm (42000 rpm default)

Programmable power limit

settings

Variable from 50-200W (160W

default)

95 sccm

115 sccm

Start time to 90% speed 160s

Pump rotational speed;Power consumption; Pump temp;

Controller temp Forced air / water

Cooling method?

Ambient air temp for forced air

cooling

5 - 35°C

Min cooling water flow rate

(water 15°C)

15 l h

Water temp range 10 - 20°C
Max inlet flange temp 80°C

Operating attitude Vertical and upright, through to Horizontal +/- 2°

<45 dB(A)

Noise level at 1 metre

Max magnetic field pump can

tolerate

5 mT

Recommended controller

TIC200 turbo and instrument

controller

Quiescent electrical power Typically 20W

nEXT400D Turbomolecular Pump

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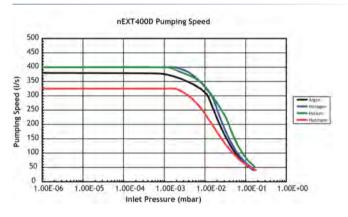


The nEXT400D is a hybrid bearing compound turbopump that replaces the EXT406PX ISO160 pump. It is available with either an ISO160 or a CF160 inlet flange and has a $\rm N_2$ pumping speed of 400l/s. nEXT pumps build on our previous products maintaining the proven bearing technology (oil lubricated ceramic lower bearing with dry permanent magnetic upper bearing), whilst adding an improved rotor design with a new molecular drag stage to deliver improved pumping speed and compression ratios, and true user serviceability. They feature 24V to 48Vdc sensorless motors with a built in drive that is fully compatible with those on our DX pumps and our range of TIC controllers.

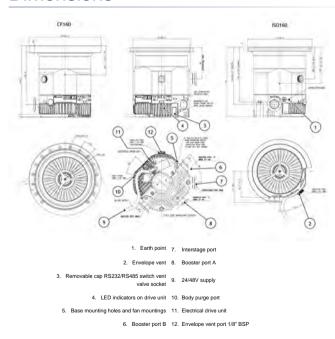
Features & Benefits

- State-of-the-art rotor design enhances performance to deliver exceptional pumping speeds and compression ratios
- Fully end user serviceable in minimum time without complex tooling or major disassembly...you can do it!
- Compact design with high performance for efficient systemisation
- Compatible with Edwards TIC turbo and instrument controllers meaning you can add up to 3 vacuum gauges without the need of an additional gauge controller
- · RoHS compliant and CSA/UL approved

Performance Curves



Dimensions



Product Description	Order No.
nEXT400D Turbomolecular Pump ISO160 Inlet Flange	B83200300
nEXT400D Turbomolecular Pump CF160 Inlet Flange	B83200400
Accessories & Spares	Order No.
TIC Controller	D39722000
nEXT Radial Fan	B58053175
nEXT Radial Fan with Connector for Pump Drive	B58053170
nEXT Water Cooling Kit	B80000815
Oil Cartridge Tool Kit	B80000812
Bearing Tool Kit	B80000805
Oil Cartridge	B80000811
Bearing and Oil Cartridge	B80000810

Technical Data

Inlet flange DN160ISO-K, DN160CF

Pumping speed

 N_2 400 ls⁻¹ 390 ls⁻¹ He H_2 325 ls⁻¹

Compression ratio

 N_2 <1 x 10¹¹ 1 x 10⁸ He H_2 5 x 10⁵ DN25NW Outlet flange RV12/XDS10 Recommended backing pump* Vent port 1/8 inch BSP female Purge port 1/8 inch BSP female

Max continuous inlet flow

(Nitrogen)[†]

Water cooling (water at 15°C, ambient temp at 40°C)

Forced air cooled, 35 °C

ambient

Pump rotational speed

Nominal rotational speed 60000 rpm

Variable from 33000 to 60000 Standby rotational speed

rpm (42000 rpm default)

Programmable power limit

settings

Variable from 50-200W (160W

Pump rotational speed; Power

default)

105 sccm

90 sccm

Start time to 90% speed 180s

Analogue outputs consumption; Pump temp;

Controller temp Forced air / water

Cooling method?

Ambient air temp for forced air

cooling

5 - 35°C

Min cooling water flow rate

(water 15°C)

15 l h

Water temp range 10 - 20°C Max inlet flange temp 70°C

Vertical and upright, through to Operating attitude Horizontal +/- 2º

<45 dB(A)

Noise level at 1 metre Max magnetic field pump can

tolerate

5 mT

TIC200 turbo and instrument Recommended controller

controller

Quiescent electrical power Typically 20 W

TIC Controller

2

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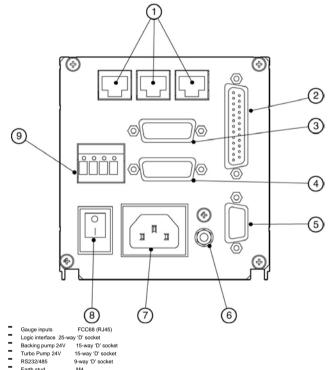
A compact turbo controller with a large clear graphical display, an intuitive user interface and serial communications providing full remote control and data logging functions via a new Windows™ based PC program.

The controller automatically recognizes and supports one 24 V turbomolecular pump from the EXT range. Cooling and vent valve support is provided directly from the controller. Mains backing pumps (up to E2M28) may be controlled via an optional relay box. The relay box also controls a mains heater band and backing line isolation valve and may include three 250 V a.c. 3 A changeover relays, which are activated by the gauge open collector set point outputs.

Features & Benefits

- TIC automatically recognizes and controls one 24 V turbomolecular pump from either the DX or EXDC ranges. DX turbos have full serial communication with TIC and may be both configured and report status via TIC.
- Both mains and 24 V backing pumps may be controlled by TIC. For larger vacuum systems the TIC may control mains backing pumps, including XDS10 and up to RV12, via the optional relay
- The optional external relay box enables mains backing pumps to be controlled and also provides interfaces for a turbo heater band, a backing line isolation valve and a logic bypass.
- All relay boxes include a logic bypass facility for further system integration. See website for details.
- In most instances, TIC systems may be simply and quickly configured using the range of standard cables on offer, there is therefore no need for the customer to prepare loom assemblies or relay boxes and special interfaces. TIC controllers can be bench or rack mounted.

Dimensions



Technical Data

Dimensions

Turbo Pump Options EXT75DX 100W (200W) Fast (Fast) EXT255DX 100W (200W) Slow (Fast) EXT406PX 200W Fast Mains input Electrical supply 90 to 264 V a.c. 47 to 63 Hz Power consumption (max) 215 VA 10.3 A @ 110 V a.c. / 23.0 A @ Peak inrush current 230 V a.c. Earth stud M4 Auxiliary terminals 24 V d.c. 3 W max, ACX70, Air cooling fan **ACX75 & ACX250H** 24 V d.c. 2 W max, TAV5 & Vent valve TAV6

Order No.
D39711000
D39712000
D39721000
D39722000
Order No.
D39711805
D39700835
D39700836
D39700837
D39700831

55

110	mm	high x	105	mm	wide x	
0.45		.1				

245 mm deep

Front panel 106 mm wide x 128 mm high

Weight 3.5 kg Operating temp +0 ° to +40 °C Storage temp -30 ° to +70 °C

Electronics housing

90% RH non-condensing at 40 Max ambient operating humidity

Max operating altitude 3000 m Electronic Design EN 61010-1

EN 61326 Industrial Location, Electromagnetic Compatibility

Class B Emissions

Enclosure rating IP20

TIC Mains Cable IEC320 M/F 5M	D39700832
TIC Logic Interface Cable 2m	D39700833
TIC RS232 Interface Cable 2m	D39700834
TIC front bezel kit	D39700803
Linecord 2M UK Plug	D40013025
Linecord 2M North Euro Plug	D40013030
Linecord 2m With US Plug	D40013120

EXC250 Controller

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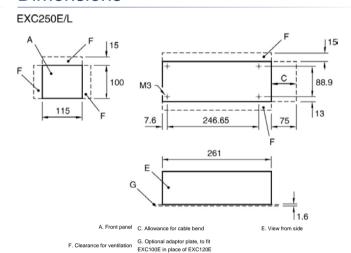
The EXC250 E and L are mains driven 'black box' controllers providing power and control for the EXT556H. The EXC250L includes a 1m turbo to controller cable.

The EXC Controller has a high-efficiency, auto-ranging power supply which adjusts itself to any external electrical supply in the specified voltage. The power supply converts the single-phase electrical supply into a regulated d.c. electrical supply to control the operation of the EXT pump.

Features & Benefits

- Switched-mode power supplies which automatically adjust to any electrical supply.
- Electromagnetic compatibility which exceeds the requirements of the European generic immunity and emission standards.
- Regenerative power supply which provides vent-valve control options.
- Rear panel sockets for vent-valve, air-cooler and active vacuum gauge.
- · Full remote control.

Dimensions



Technical Data

Electrical supply voltage	90 - 264 V
Electrical supply frequency	47 - 63 Hz
Max input power (without bakeout band)	440 VA
Max power output	250
Ambient temp range	0 – 40 °C
Enclosure protection rating	IP20
Electromagnetic emission	EN61326 class B
Weight	2.0 kg
Timeout range on <50% speed	1 - 30 min
Factory set timeout (speed rising)	8 min
Normal speed set point range	65 - 95 %
Factory set normal speed [‡]	80 %
Vent options, factory settings	
Vent on Controller Stop, at	50 % speed
Vent on electrical supply fail, at	50 % speed
Vent on pump fail, at	50 % speed
Vent options, alternative selectable options	
Vent on Controller Stop, after	2 s
Vent on pump fail, after	2 s

Product Description	Order No.
EXC250E Turbomolekurpumpencontroller	D39635000
EXC250L Turbomolekurpumpencontroller	D39636000

^{* %} of pump nominal rotational speed.

EXC300 Controller

The EXC300 are mains driven turbo controllers with a front panel control and indication providing power and control for the EXT556H.

The Controller has a high-efficiency, auto-ranging power supply which adjusts itself to any external electrical supply in the specified voltage. The power supply converts the single-phase electrical supply into a regulated d.c. electrical supply to control the operation of the EXT pump.



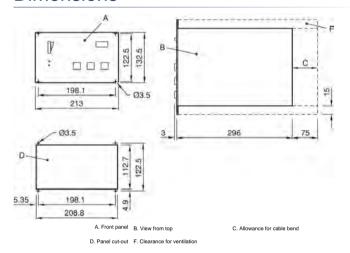
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Features & Benefits

- Switched-mode power supplies which automatically adjust to any electrical supply.
- Electromagnetic compatibility which exceeds the requirements of the European generic immunity and emission standards.
- Regenerative power supply which provides vent-valve control options.
- Rear panel sockets for vent-valve, air-cooler and active vacuum gauge.
- Full remote control.

Dimensions



Technical Data

Electrical supply voltage	90 - 132 and 180 - 264 V
Electrical supply frequency	47 - 63 Hz
Max power with bakeout band	700 VA
Max power no bakeout band	550 VA
Max power output	290
Ambient temp range	0 – 40 °C
Enclosure protection rating	IP20
Electromagnetic emission	EN61326 class B
Weight	4.6 kg
Timeout range on <50% speed	1 - 30 min
Factory set timeout (speed rising)	8 min
Normal speed set point range	65 - 95 %
Factory set normal speed	80 %
Vent on Controller Stop, at	50 % speed
Vent on electrical supply fail, at	50 % speed
Vent on pump fail, at	50 % speed
Alternate vent options	
Vent on Controller Stop, after	2 s
Vent on pump fail, after	2 s

Product Description	Order No.
EXC300 Turbomolecular Pump Controller	D39614000
Accessories & Spares	Order No.
Linecord 2M Without Plug	D40013020
Linecord 2M UK Plug	D40013025
Linecord 2M North Euro Plug	D40013030
Linecord 2m With US Plug	D40013120
EXT Pump To Controller Cable 1M	D39618010
EXT Pump To Controller Cable 3M	D39618030
EXT Pump To Controller Cable 5M	D39618050

^{* %} of pump nominal rotational speed.

We offer a complete range of accessories and spares for the EXT pumps. A brief description of each of these items is given below.

Pump-to-Controller Cable

A pump-to-controller cable must be ordered separately for EXC300 & EXC250E and is available in 1, 3 and 5 m lengths, to suit your installation, (other lengths are available on request).

Ordering Information

Product Description	Order No.
1 m cable	D39618010
3 m cable	D39618030
5 m cable	D39618050

ACX Air-Cooler

An ACX air-cooler is used to cool an EXT pump when a suitable cooling-water supply is not available or for an EXT pump in a mobile pumping system. The ACX air-cooler is an enclosed electrical fan and fixing bracket assembly which is easily fitted to bolt holes in the base of the pump.

The ACX air-cooler has a 24 V d.c. motor which can be powered and controlled from a rear panel socket on the EXC/TIC Controller or DX pump. It is supplied with 3 m of electrical cable.

Ordering Information

To Fit Pumps	Order No.
EXT75DX	B58053075
EXT255DX	B58053160
EXT556H	B58053561
EXT406PX	B58053405
EXT406PX	B58053455
	EXT75DX EXT255DX EXT556H EXT406PX

BX Bakeout Band

Use a BX bakeout band to increase the rate of degassing of the pump body to achieve faster pump down and lower ultimate pressure. Bakeout bands are only fitted to CF flanged pumps and/or intended for use in ultra high vacuum systems.

Bakeout bands are available for use with 110-120 or 220-240 V a.c. electrical supplies and can be powered from a rear panel socket on the EXC/TIC Controller or DX pump. It is supplied with 3 m cable and mating CE22 connector.

Ordering Information

Product Description	To Fit Pumps	Order No.
BX70, 110 V, 30 W	EXT75DX	B58052040
BX70, 240 V, 30 W	EXT75DX	B58052060
BX250, 110 V, 60 W	EXT255DX	B58052041
BX250, 240 V, 60 W	EXT255DX	B58052061
BX501, 110 V, 100 W	EXT556H	B58052044
BX501, 240 V, 100 W	EXT556H	B58052064
BX450, 110 V, 100 W		B58052043
BX450, 240 V, 100 W		B58052063
BX250, 110 V, 60 W		B58052041
BX250, 240 V, 60 W		B58052061

PRX10 Purge-Restrictor

The PRX10 purge-restrictor is used to set the flow-rate of purge gas into the EXT pump. All of the EXT pumps have a purge-port to allow you to purge the motor and bearing cavity with dry nitrogen or another inert gas. Fit a vent-port adaptor to the purge-port of the EXT255DX pumps to convert it from 1/2 inch BSP to DN10NW, before you use the PRX10

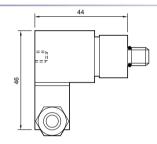
Ordering Information

Product Description	Order No.
PRX10 purge-restrictor	B58065001

TAV Vent-Valve

The TAV vent-valves are 24 V d.c. solenoid operated valves which you can use to vent your vacuum system with atmospheric air or dry nitrogen when you switch off the EXT pump. The valves are supplied with a sintered bronze inlet-filter, a riffled hose connector, 3 m of electrical cable and a DN10NW adaptor. The vent-valves can be powered and controlled from a rear panel socket on the EXC Controller. You can either use your TAV vent-valve to replace the manual vent-valve supplied with the EXT pump, or adapt it to fit any other suitable port on the vacuum system upstream of the turbomolecular pump.

Dimensions



Ordering Information

Product Description	Order No.
TAV5 vent-valve	B58066010
TAV6 vent-valve	B58066020

Vent-Port Adaptor

This ½ inch BSP male to DN10NW adaptor can be used to replace the TAV5 vent-valve or the manual vent-valve fitted to the EXT pumps. It allows the threaded vent-port on the pump (and the threaded purge-port on the EXT75DX, EXT255DX, EXT406PX and EXT556H) to be converted to a DN10NW flange.

The vent-port adaptor is supplied with a removable flow-restrictor and an O-ring to seal the adaptor to the pump.

Product Description	Order No.
Vent-port adaptor	B58066011

VIbration Isolator

A vibration isolator can be fitted to the inlet-flange of the EXT pump to reduce the transmission of the small amount of vibration generated by the pump to your vacuum system. The vibration isolator has two flanges separated by a flexible stainless steel bellows and an outer rubber anti-vibration collar.

The vibration isolator is designed for use with vertically mounted pumps only.

Ordering Information

To Fit Pump Inlet-Flange	Order No.
DN63CF	B58101000
DN63ISO-K	B58115000
DN100ISO-K	B58120000
DN160ISO-K	B58125000
DN100CF	B58105000
DN160CF	B58110000

VRX Vent-Restrictor

Fit a VRX vent-restrictor to your EXT pump if you will vent the pump when the pump speed is above 50% of full rotational speed. The vent-restrictor restricts the flow-rate of the vent gas into the EXT pump. You can also use the VRX to replace the standard restrictor supplied with the PRX10 purge restrictor to obtain a different purge rate.

You can fit the vent-restrictor to the TAV vent-valve, to the vent-port adaptor or directly to the vent or purge port of the EXT75DX, EXT406PX, EXT556H and EXT255DX pumps.

Ordering Information

VRX Vent-Restrictor	Orifice Diameter (mm)	Order No.
VRX10	0.1	B58066021
VRX20	0.2	B58066022
VRX30	0.3	B58066023
VRX50	0.5	B58066024
VRX70	0.7	B58066025

EXT Spares

Each EXT pump is supplied with an inlet seal, inlet screen and water cooler (with the exception of DX pumps). These items may also be ordered as spares.

Product		To Fit Inlet	
Description	Pump Type	Flange Size	Order No.
Inlet flange seal	S		
DN40NW Co-	-Seal, fluoroelast	omer	B27158453
DN50NW Co-	-Seal, fluoroelast	omer	B27158466
ISO63 Trappe	ed O-ring, fluoroe	elastomer	B27158170
ISO100 Trapp	ped O-ring, fluoro	elastomer	B27158171
ISO160 Co-S	eal, fluoroelastor	ner	B27158074
63CF copper	compression gas	sket (pack of 10)	C10007490
100CF coppe	er compression ga	asket (pack of 10)	C10009290
160CF coppe	er compression ga	asket (pack of 5)	C10011290
ISX inlet-screen	1		
ISX100/6	EXT255DX	DN100ISO-K, DN100CF	B58051001
100 coarse	EXT406PX		B75640813
160 coarse	EXT406PX		B76021806
ISDX63/4	EXT75DX	DN63ISO-K, DN63CF	B72240860
ISHX160/8C	EXT556H (coarse)	DN160ISO-K, DN160CF	B58051007
ISHX160/8F	EXT556H (fine)	DN160ISO-K, DN160CF	B58051008
WCX water-cooler			
WCX250M	EXT406PX		B73501164
WCX250	EXT75DX, EXT255DX		B73600121
WCX555H	EXT556H		B58067003

nEXT Turbopumping Stations

Our new range of nEXT turbopumping stations build on our previous generation, but with a simplified ordering matrix and expanded range to include turbopumps with speeds from 42l/s to 400l/s.

For pumping speeds from 42l/s to 66l/s we offer our trusted EXT75DX pump with a choice of various wet and dry backing pumps and a Turbo and Instrument TIC100.

For pumping speeds of 240l/s to 400l/s the new turbopumping stations are based on our nEXT pumps offering the additional flexibility of end-user serviceability plus a choice of backing pumps and a Turbo and Instrument TIC200.

Turbopumping stations fitted with E2M1.5 or RV pumps come with an EMF mist filter fitted, and those fitted with our class leading XDS scroll pumps have an isolation valve fitted between the turbopump and backing pump as standard.

All turbopumping stations include 4 locking castor wheels, a benchtop mounting kit, built in air cooling and come configured to suit a wide variety of applications such as:

- · UHV systems
- Beam lines
- · Load locks

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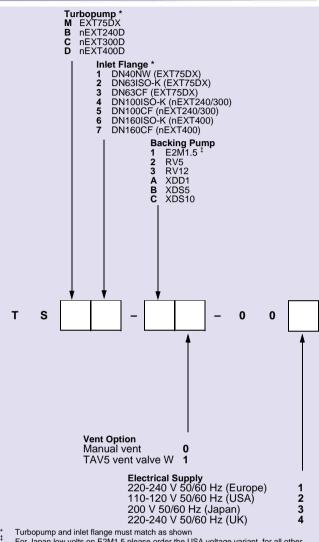
- · Surface science
- · High energy physics

Features & Benefits

- · Fully assembled and ready to use
- Where nEXT is fitted the turbopump is fully end user-serviceable
- Control of the turbopump, backing pump and gauges from the integrated TIC
- Serial communication control available with RS232 and RS485 (Windows software included)
- Dry pumping options with XDD1, XDS5 and XDS10



Ordering Information



Turbopump and inlet flange must match as shown For Japan low volts on E2M1.5 please order the USA voltage variant, for all other pumps please order Japan version and specify low volts on your order

STP Magnetically Levitated Turbomolecular Pumps

In April 2002, Edwards Acquired the Turbomolecular Pump Business of Seiko Instruments. Inc.

- Distributed and supported globally by Edwards for nearly twenty
- Designed by continuous improvement on existing proven reliable technology
- · Advanced materials and designs provide:
 - Class leading performance
 - Low vibration
 - Guaranteed reliability
 - Low cost of ownership
- The broad product range covers all potential turbo pump
- Qualified by all major semiconductor OEM's
- Used in all major semiconductor fabrication plants
- Installed base of over 80000 units, 85% in the semiconductor



Key Features

- Multi-axis magnetic bearing system
- High Throughput versions for high flow processes
- Low vibration characteristics
- Advanced controller technology
- Full interfacing capability

Features & Benefits

- · Improved pumping performance
 - Optimized for semiconductor process pressures
 - Maximized gas throughput for each flange size
 - Applications specific models
- · New generation universal controllers
- · Compact (1/2 rack) controller
- Auto tune enabling "mix and match" pumps
- Integrated TMS control Improved diagnostics
- · High power d.c. motor drive
 - Fast ramp-up time
 - Self regeneration upon power failure, eliminating the need for batteries



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Edwards is a leader in clean and dry vacuum technology. The first STP pumps were sold in 1983 and there are now over 80000 installations worldwide. 85% are operating on semiconductor process tools where they demonstrate exceptional levels of reliability. STP pumps are the first choice for applications demanding high up-time, hydrocarbon-free pumping, minimal maintenance and low vibration.

- Proven reliability.
- Clean oil-free high vacuum.
- Complete range from 300 to 4500 I s⁻¹.
- Application specific models.
- Very low noise and vibration.
- Low cost of ownership.
- Virtually maintenance free.
- Installation in any orientation.
- Full remote control interface.
- Supported globally by Edwards

Proven Magnetic Bearing Technology

The rotor is entirely suspended by magnetic bearings so all contact between the rotor and the remainder of the pump is eliminated. As well as giving very low vibration, the elimination of contact means no bearing wear and no requirement for consequent pump maintenance.

STP Range



UHV Series The Ultra High Vacuum series of magnetically levitated turbo molecular pumps are the products of choice for the semiconductor, surface science or high energy physics industries. They offer unrivalled reliability, performance, cleanliness and class leading low vibration levels. The pumps are all d.c. powered, eliminating the need for batteries, they use a half rack controller which features auto-tuning and advanced diagnostic features. The range contains pumps with speeds from 300 I s⁻¹ to 1000 l s⁻¹ all of which are available in ISO or CF flange

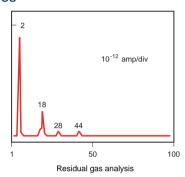


High Throughput Series The high throughput series of magnetically levitated turbo pumps generate the high gas flows required by the current generation of semiconductor etch, ion implant and LCD systems. All the pumps feature a five active axis magnetic bearing system and a d.c. drive for increased robustness and stability. They use a Holweck stage to provide advanced throughput performance. They operate via a half rack controller with auto-tuning, advanced diagnostics and an integrated temperature management system. The range operates with throughput speeds from 300 I s⁻¹ to 1300 I s⁻¹.



Advantage Series The new Advantage series of magnetically levitated turbo pumps have been designed to provide the highest levels of throughput required by the next generation of semiconductor etch and CVD processes. They have been developed, using continuous improvement techniques, from the ultra reliable, high performance H series of products. Their advanced rotor design combined with selection of the best materials has allowed the creation of the next generation of high throughput turbo pump inside the same footprint as many of the existing models. The range contains pumps with throughput speeds from 800 l s⁻¹ to 4500 l s⁻¹.

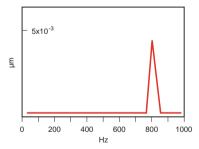
STP Features



Oil Free All STP turbomolecular pumps are oil free. The use of magnetic bearings eliminates all hydrocarbon lubricants ensuring no contamination of the vacuum process from the turbomolecular pump. This feature is vital in the semiconductor industry (where device densities are constantly increasing) and in surface science or high energy physics applications (where even minute degrees of contamination disrupt measurements).

Maintenance Free Unlike conventional mechanical bearings, magnetic levitation means there is no frictional contact, eliminating sources of wear and vibration. This feature enables STP turbomolecular pumps to run for years with virtually no maintenance, reducing annual operating costs to a minimum and ensuring maximum up-time is achieved. This maintenance free feature can be particularly beneficial on processes producing chemical or radioactive contamination.

Vibration Free Magnetic levitation of the rotor results in an extremely low level of noise and vibration. Peak-to-peak vibration level is less than 0.02 µm. This amplitude remains constant throughout the life of the pump and is free from troublesome sub-harmonics.



Vibration analysis STP300 displacement/frequency

Automatic Balancing System (ABS) ABS is a unique patented development of 5-axis technology. If any rotor imbalance is introduced (by deposition of process by-products, for example), sensors in the pump detect changes in the rotor motion and compensate the magnetic bearing fields to allow the rotor to spin on its natural inertial axis. This minimizes the vibration transmitted to the inlet flange. ABS works at all pump rotational speeds.

Safety Backup Bearings STP pumps have dry lubricated axial and radial mechanical bearings as safety backup bearings. These support the rotor and protect the pump in the event of a total disruption of magnetic suspension or a massive air inrush which overcomes the magnetic bearing stiffness. These high precision ball bearings are dry lubricated and are not in contact with the rotor during normal operation.



Optimized Rotors The multistage pure bladed rotors in the UHV pumps provide the high vacuums required for clear beamlines on CD SEM machines, mass spectrometers and ion implanters. They provide optimum pumping performance with excellent light gas compression ratios.



Compound Rotors The high throughput pumps incorporate a Holweck drag stage that increases the pumps throughput at low pressure.



Advanced Series Compound Rotors The advanced series pumps have a redesigned compound rotor, the materials of manufacture have been improved to reduce the clearances within the pump, the rotors have an advanced 3D design and the Holweck stage has been redesigned to increase the throughput.



Corrosion Resistant To ensure a high level of resistance to corrosion, the corrosion resistant (C) and high throughput (H-C) pumps have nickel coated rotors/stators and pump internals suitable for ion implantation and plasma etching. Further enhanced levels of protection are available on request.



Nitrogen Purging The corrosion resistant (C) pumps and the high throughput (H-C) pumps have a nitrogen purge facility, a constant flow of nitrogen through the pump dilutes corrosive gases minimizing their damage to the pumps motor and sensor coils.



TMS System The Edwards Temperature Management System is available on a wide range of turbo pumps. It is designed to optimize the temperature within the pump, dramatically reducing the particle condensation within. This will not only considerably enhance the performance of the pump under harsh process conditions, but also increase its operational life.

Applications

Semiconductor Fabrication STP turbomolecular pumps are the number one choice for the world's leading semiconductor etch and implant manufacturers. The pumps are installed on the harshest applications (for example, metal etch) and demonstrate exceptional levels of reliability.

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station
- MBE
- Diffusion
- · Photo resist stripping
- Crystal/epitaxial growth
- · Wafer inspection
- · Load lock chambers

Scientific Applications STP pumps are used extensively in the world's foremost research and development institutes. The pumps satisfy stringent performance criteria and reliability expectations. They are also used in the following applications:

- Scientific instruments: surface analysis, mass spectrometry, electron microscopy
- · High energy physics: beam lines, accelerators
- · Radioactive applications: fusion systems, cyclotrons

STP-IX455 Turbomolecular vacuum pump

The STP-iX455 turbo-molecular pump features an innovative, magnetic bearing and motor drive system, providing a 50% reduction in vibration compared to previous generation turbo pumps. An integrated controller eliminates the need for a conventional, rack-mounted controller and interconnecting cables, and does not require water cooling. The pump features 450 l/s pumping speed for nitrogen. The STP-iX455 is an excellent fit for electron microscope, metrology, lithography and other vibration sensitive applications.

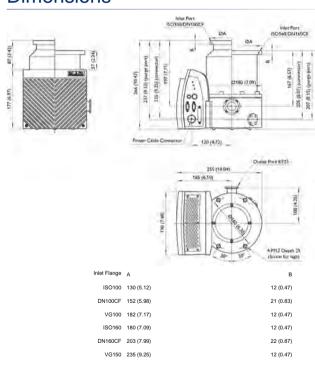


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Features & Benefits

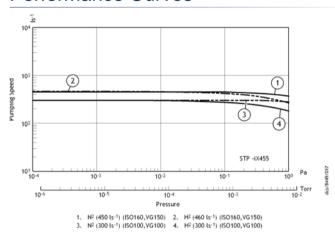
- Compact Design including a fully integrated controller
- Inovative, Self-Sensing magnetic bearing system
- Digital 5-axis control
- Vibration levels reduced by 50% compared to the existing turbo pumps
- Can be configured to run corrosive processes

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Technical Data

Storage temperature range

Weight

Inlet flange	ISO100K
Pumping Speed	
N_2	300 l s ⁻¹
H_2	300 l s ⁻¹
Compression ratio	
N_2	>10 ⁸
H ₂	>1 x 10 ⁴
Ultimate pressure	6.5 x 10 ⁻⁶ order Pa
Maximum working pressure	1.3 x 10 ⁻¹ Pa
Allowable backing pressure	67 Pa
Rated speed	55000 rpm
Starting time	<6 min
Mounting position	Any orientation
Cooling method	Natural cooling (water cooling o air cooling when baking and gas pumping)
Lubricating oil	Not necessary
Backing pump	240 l min ⁻¹
Leakage Magnetic Flux	
Axial direction	<100 m Gauss
Radial direction	<100 m Gauss
Ambient temperature range	0 to 40 °C

-25 to 55 °C

15 kg

Ordering Information

Product Description	Order No.
STP-iX455 Turbomolecular pump ISO100K	PT640Z010
STP-iX455 Turbomolecular pump ISO160K	PT640Z020
STP-iX455 Turbomolecular pump DN100CF	PT640Z050
STP-iX455 Turbomolecular pump DN160CF	PT640Z060
Accessories & Spares	Order No.
iPS240 Power supply	PT64W0Z00
STP-iX455-iPS240 interconnection cable 5 m	PT64Y0B20
STP-iX455-iPS240 interconnection cable 10 m	PT64Y0B30
STP-iX455-iPS240 interconnection cable 15 m	PT64Y0B40
STP-iX455-iPS240 interconnection cable 20 m	PT64Y0B50
Power supply cable for iPS240 3m	PT64Y0A10
Power supply cable for iPS240 5m	PT64Y0A20
iDT-001 Display unit	PT64W1Z00

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STP301 Turbomolecular Vacuum Pump

Edwards STP301 is for use in electron microscopes and semiconductor applications. Edwards rotor technology gives class-leading performance for maximum process flexibility. The STP301 has been approved for use by major equipment manufacturers in the scientific instrument, semiconductor and magnetic media industries.

This STP pump is supplied with an inlet screen.

For a complete installation order an STP pump, a controller, a connection cable and power cable.



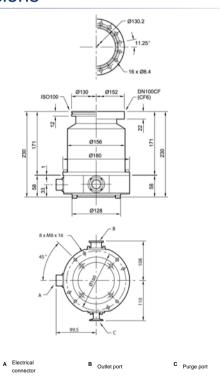
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Features & Benefits

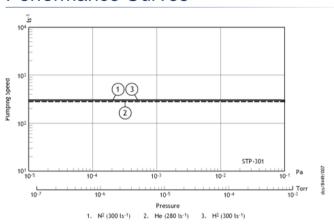
- · Advanced rotor technology
- Maximized process flexibility
- Oil free
- Low vibration
- High reliability

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Technical Data

Inlet flange ISO100
Outlet port KF25

Pumping Speed

 N_2 300 | s⁻¹ H_2 300 | s⁻¹

Compression ratio

 N_2 <10⁸ H₂ <2 x 10⁴

Ultimate pressure with bake out heating $\rm 6.5 \times 10^{-6}~Pa~(5 \times 10^{-8}~Torr)$

Maximum allowable inlet

pressure

Ambient cooled 0.066 Pa (5 x 10⁻⁴ Torr)

Maximum continuous outlet

pressure

Ambient cooled 13 Pa (0.1 Torr)
Rated speed 48000 rpm
Starting time 3 min
Maximum inlet flange temperature 120 °C

Input voltage 100 to 120 V a.c. (± 10%) or 200 to 240 V a.c. (± 10%)

Power consumption

Start up 0.55 kVA

Weight

Pump 11 kg Controller 7 kg

Product Description	Order No.
STP301 ISO100 Inlet KF25 Outlet	B74830020
STP301 DN100CF Inlet	B74831010
STP301C ISO100 Inlet	B74871010
STP301C DN100CF Inlet	B74881010
STP301C ISO100 inlet KF40 outlet	B74872000
STP301C ISO100 inlet KF25 outlet	B74871000
Accessories & Spares	Order No.
Connection cable, 3m	B70700010
Connection cable, 5m	B70700000
Connection cable, 12m	PT21Y0B08
Type B P/Cab 3M UK Plug	A50505010
Type B P/Cab 3M Europe Plug	A50506010
Type B P/Cab 5M Ring Terminals	B70700040
Type B P/Cab 3M Ring Terminals	B70700090
SCU301/451 Controller 200-240VAC	PT21Z0Z04

STP-L301 Turbomolecular Vacuum Pump

Edwards corrosion resistant STP-L301(C) is for use in electron microscopes and semiconductor applications. Edwards rotor technology gives class-leading performance for maximum process flexibility.

The STP-L301(C) has been approved for use by major equipment manufacturers in the scientific instrument, semiconductor and magnetic media industries.

B Outlet port



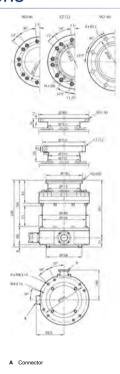
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Features & Benefits

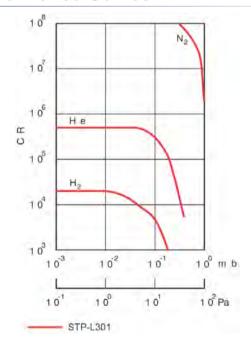
- Advanced rotor technology
- · Maximized process flexibility
- Oil free
- Low vibration
- High reliability

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO100 Outlet port KF25 Purge port KF10

Pumping Speed

 N_2 260 l s⁻¹ 290 I s⁻¹ H_2

Compression ratio

 N_2 <10⁸ 5 x 10⁵ He H_2 2 x 10⁴

Ultimate pressure with bake out heating

10⁻⁶ Pa (10⁻⁸ Torr)

Maximum allowable inlet pressure

6.7 x 10⁻² Pa (5 x 10⁻⁴ Torr) Ambient cooled

Maximum continuous outlet

pressure

13 Pa (0.1 Torr) Ambient cooled Rated speed 48000 rpm Starting time 3 min Maximum inlet flange 120 °C

temperature

Input voltage 100 to 120 V a.c. (± 10) or

200 to 240 V a.c. (± 10)

Power consumption

Start up 0.55 kVA

Weight

Pump 13 kg Controller 7 kg

Product Description	Order No.
STP-L301C ISO100 Inlet	B75800010
STP-L301 ISO100 Inlet	B75800090
STP-L301 DN100CF Inlet	PT470Z000
STP-L301C DN100CF Inlet	PT47AZ030

STP603 Turbomolecular Vacuum Pump

Edwards STP603 is a new turbomolecular pump for use in the most advanced semiconductor applications. Edwards rotor technology gives class-leading performance for maximum process flexibility. This pump has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



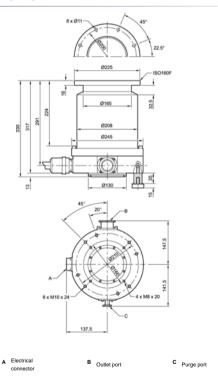
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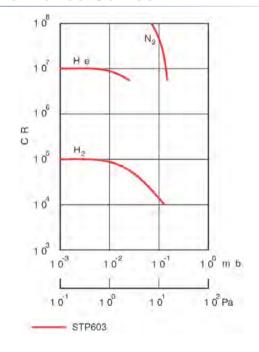
- Advanced rotor technology
- Maximized process flexibility
- Oil free
- Low vibration
- High reliability

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO160F
Outlet port KF40
Pumping Speed

 N_2 650 $I s^{-1}$ H_2 550 $I s^{-1}$

Compression ratio

 N_2 <10⁸ H₂ <10⁵

Ultimate pressure with bake out heating 10^{-7} Pa (10^{-9} Torr)

Maximum continuous outlet pressure 13 Pa (0.1 Torr)
Rated speed 35000 rpm

Rated speed 35000 in Starting time 6 min Maximum inlet flange temperature 120 °C

Input voltage 100 to 120 V a.c. (\pm 10) or

200 to 240 V a.c. (± 10) Power consumption

Start up 0.8 kVA

Weight
Pump 31 kg
Controller 9 kg

Product Description	Order No.
STP603 ISO160F Inlet	B72102010
STP603C ISO160F Inlet	B72102020
STP603 DN160CF Inlet	PT390Z005
STP603C DN160CF Inlet	PT39AZ002
Accessories & Spares	Order No.
SCU-800 Control unit	YT49Z2Z00
Connection Cable 10m	B75130060
Connection Cable 3m	B75130050
Connection Cable 5m	B75130020
Power Cable 10m	PT49Y0A01
Power Cable 5m	PT49Y0A00
Vibration Isolator ISO200-K	B58061000
Water cooling coil	B72132020

STP1003 Turbomolecular Vacuum Pump

Edwards corrosion resistant STP1003C is a new turbomolecular pump for use in the most advanced of semiconductor applications. Edwards rotor technology gives class-leading performance for maximum process flexibility. This pump has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



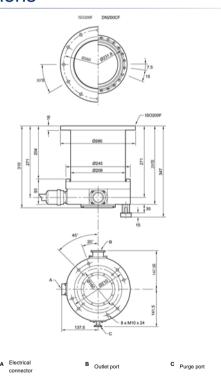
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Features & Benefits

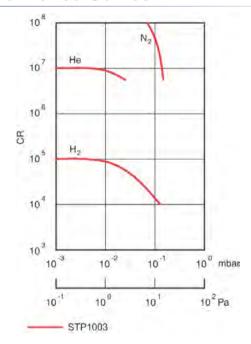
- Advanced rotor technology
- Maximized process flexibility
- Oil free
- Low vibration
- High reliability

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO200F
Outlet port KF40
Purge port KF10

Pumping Speed

 N_2 1000 l s⁻¹ 800 l s⁻¹

Compression ratio

 N_2 <10⁸ H₂ <10⁵

Ultimate pressure with bake out heating

Maximum continuous outlet 13 Pa (0.1 Torr)

pressure 13 Pa (0.1 To
Rated speed 35000 rpm
Starting time 6 min
Maximum inlet flange temperature 120 °C

Input voltage 100 to 120 V a.c. (\pm 10) or to 240 V a.c. (\pm 10)

10⁻⁷ Pa (10⁻⁹ Torr)

Power consumption

Start up 0.8 kVA

Weight

Pump 31 kg Controller 9 kg

Product Description	Order No.
STP1003C ISO200F Inlet	B72101030
STP1003 ISO200F Inlet	PT390Z001
STP1003C DN200CF Inlet	PT39AZ003
STP1003 DN200CF Inlet	B72101040
Accessories & Spares	Order No.
SCU-800 Control unit	YT49Z2Z00
Connection Cable 10m	B75130060
Connection Cable 3m	B75130050
Connection Cable 5m	B75130020
Power Cable 10m	PT49Y0A01
Power Cable 5m	PT49Y0A00
Vibration Isolator ISO200-K	B58061000
Water cooling coil	B72132020

STPH301 Turbomolecular Vacuum Pump

Edwards high performance STPH301C turbomolecular pump has been designed for use in the harshest of semiconductor applications. The pumps field proven reliability and class-leading performance give maximum process flexibility. The STPH301C has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



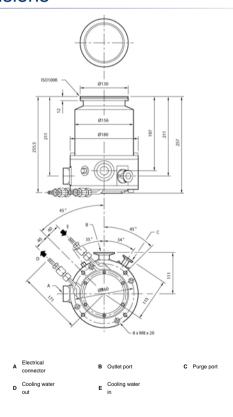
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Features & Benefits

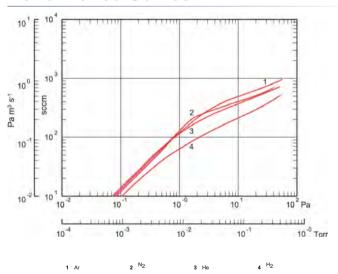
- Advanced rotor technology
- Higher gas throughput
- Maximized process flexibility
- Oil free
- Low vibration

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO100K

Outlet port KF40

Purge port KF10

Water cooling fitting PT1/4

Pumping Speed

 $\begin{array}{ccc}
\mathsf{N}_2 & 300\,\mathsf{Is}^{-1} \\
\mathsf{H}_2 & 200\,\mathsf{Is}^{-1}
\end{array}$

Compression ratio

Ultimate pressure with bake out heating 10⁻⁷ Pa (10⁻⁹ Torr)

Maximum continuous outlet 660 Pa (5 Torr)

Pressure

Maximum Nitrogen throughput

2500 sccm

Rated speed

48000 rpm

Rated speed 48000 rpm
Starting time 4 min
Maximum inlet flange temperature 120 °C

Input voltage 100 to 120 V a.c. (± 10) or

200 to 240 V a.c. (± 10)

Power consumption 0.6 kVA

Weight

Pump 15 kg Controller 9 kg

Ordering Information

Product Description	Order No.
STPH301C ISO100K Inlet	B71901010
STPH301C DN100CF Inlet	PT340Z004
STPH301CV TMS ISO100F Inlet	PT3416001
STPH301CV TMS DN100CF Inlet	PT3416005

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STPH451 Turbomolecular Vacuum Pump

Edwards high performance STPH451C turbomolecular pump has been designed for use in the harshest of semiconductor applications. The pumps field proven reliability and class-leading performance give maximum process flexibility. The STPH451C has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



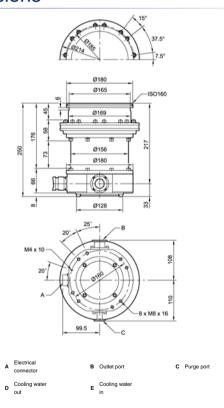
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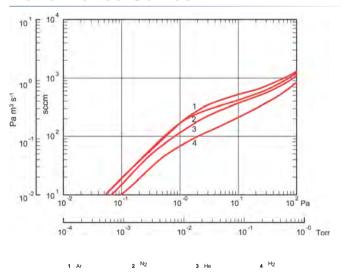
- Advanced rotor technology
- Higher gas throughput
- Maximized process flexibility
- Oil free
- Low vibration

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO160K Outlet port KF40 Purge port KF10 PT1/4 Water cooling fitting

Pumping Speed

 N_2 450 l s⁻¹ H_2 300 l s⁻¹

Compression ratio

 N_2 <10⁸ 10³ H_2

Ultimate pressure with bake out 10⁻⁷ Pa (10⁻⁹ Torr)

Maximum continuous outlet 660 Pa (5 Torr) pressure

Maximum Nitrogen throughput 2500 sccm Rated speed 48000 rpm Starting time 4 min Maximum inlet flange

120 °C temperature

Input voltage 100 to 120 V a.c. (± 10) or 200 to 240 V a.c. (± 10)

Power consumption 0.6 kVA

Weight

Pump 15 kg Controller 9 kg

Ordering Information

Product Description	Order No.
STPH451C ISO160K Inlet	B71901001
STPH451C DN160CF Inlet	PT340Z005
STPH451CV TMS ISO160F Inlet	PT3416007
STPH451CV TMS DN160CF Inlet	PT3416006

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STPA803C Turbomolecular Vacuum Pump

Edwards STPA803C turbomolecular pump is designed for use in semiconductor applications. Edwards advanced rotor technology gives class-leading performance for maximum process flexibility. The STPA803C has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



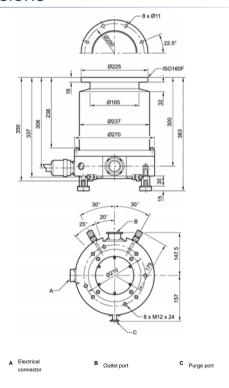
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Features & Benefits

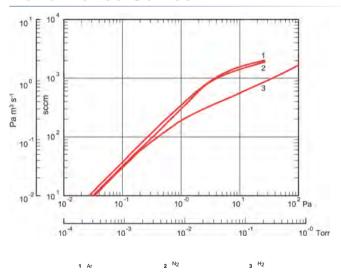
- Advanced rotor technology
- Maximized process flexibility
- Oil free
- Low vibration
- High reliability

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO160F Outlet port KF40 Purge port KF10 PT1/4 Water cooling fitting **Pumping Speed**

 N_2

800 l s⁻¹ H_2 520 l s⁻¹

Compression ratio

2

Page

 N_2 <10⁸ 10³ H_2

Ultimate pressure with bake out

270 Pa (2 Torr)

Maximum continuous outlet pressure

Maximum Nitrogen throughput 1500 sccm 32500 rpm

10⁻⁷ Pa (10⁻⁹ Torr)

Rated speed Starting time

7 min 120 °C

Maximum inlet flange temperature Input voltage

200 to 240 V a.c. (± 10)

Power consumption

0.85 kVA

Weight

Pump 39 kg Controller 9 kg

Product Description	Order No.
STPA803C ISO160F Inlet	B71801000
STPA803C DN160CF Inlet	B71805010
STPA803CV (TMS) ISO160F Inlet	PT3626000
STPA803CV (TMS) DN160CF Inlet	PT3626003
Accessories & Spares	Order No.
SCU-800 Control unit	YT49Z2Z00
Connection Cable 10m	B75130060
Connection Cable 5m	B75130020
Power Cable 10m	PT49Y0A01
Power Cable 5m	PT49Y0A00
TMS Connection Cable Kit	PT330V000
TMS Connection Cable Kit	PT330V001
TMS Connection Cable Kit	PT330V002

STPA1303C Turbomolecular Vacuum Pump

Edwards STPA1303C is a turbomolecular pump designed for use in semiconductor applications. Edwards advanced rotor technology gives class-leading performance for maximum process flexibility. The STPA1303C has been approved for use by major equipment manufacturers in the semiconductor and magnetic media industries.



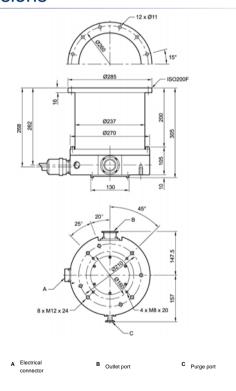
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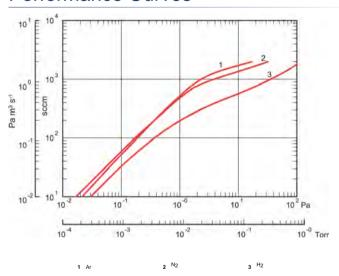
- Advanced rotor technology
- Higher gas throughput
- Maximized process flexibility
- Oil free
- Low vibration

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange	ISO200F
Outlet port	KF40
Purge port	KF10
Water cooling fitting	PT1/4
Pumping Speed	
No	1

 N_2 1300 l s $^{-1}$ 800 l s $^{-1}$

 N_2 <10⁸ H₂ 10³

Ultimate pressure with bake out heating 10^{-7} Pa (10^{-9} Torr)

Maximum continuous outlet pressure * 270 Pa (2 Torr)

Maximum Nitrogen throughput * 1500 sccm

Rated speed 32500 rpm

Starting time 7 min

Starting time 7 min

Maximum inlet flange temperature 120 °C

Input voltage 200 to 240 V a.c. (\pm 10)

Power consumption 0.85 kVA

Weight

Pump 39 kg Controller 9 kg

Product Description	Order No.
STPA1303C ISO200F Inlet	B71802020
STPA1303C DN200CF Inlet	B71803000
STPA1303C TMS ISO200F Inlet	PT3626005
STPA1303C TMS DN200CF Inlet	PT3626004
Accessories & Spares	Order No.
SCU-800 Control unit	YT49Z2Z00
Connection Cable 10m	B75130060
Connection Cable 3m	B75130050
Connection Cable 5m	B75130020
Power Cable 10m	PT49Y0A01
Power Cable 5m	PT49Y0A00
TMS Connection Cable Kit	PT330V000
TMS Connection Cable Kit	PT330V001
TMS Connection Cable Kit	PT330V002

^{*} Water cooled

STPA1603C Turbomolecular Vacuum Pump

The small and powerful Edwards STPA1603C turbo-molecular pump has been designed using Edwards advanced rotor technology. This provides high throughput, maximum reliability and class leading performance which is demanded by the latest generation of semiconductor processes. Its half rack controller and compact design provide considerable space saving, whilst its advanced deposition reduction system gives improved reliability and performance. The STPA1603C has been qualified on the latest 200 mm etch tools as well as on new generation 300 mm oxide etch processes.



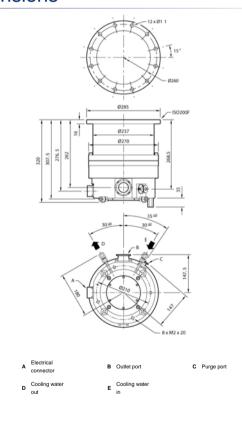
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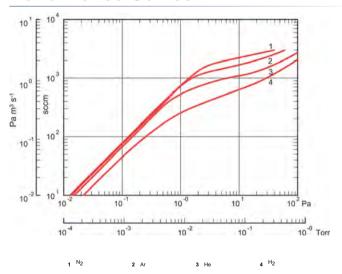
- Advanced rotor design
- Increased performance
- Higher gas throughput
- High reliability
- Maintenance free

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO200F
Outlet port KF40
Purge port KF16
Water cooling fitting PT1/4

Pumping Speed

Compression ratio

 N_2 <10⁸ H₂ <7 x 10³ Ultimate pressure with bake out heating 10^{-7} Pa

Maximum allowable backing

lowable backing 266 Pa (2 Torr)

Maximum Nitrogen throughput 2500 sccm Rated speed 36500 rpm Starting time 7 min Mounting position Any 2 I min⁻¹ Water cooling flow Temperature 5-25 °C $3 \text{ kgf} / \text{cm}^{-2}$ Pressure Recommended purge gas flow 20 sccm

Input voltage 200 to 240 V a.c. (± 10)

Power consumption 0.85 kVA

Weight

pressure

Pump 35 kg Controller 9 kg

Ordering Information

Product Description	Order No.
STPA1603C ISO200F Inlet	B75100010
STPA1603C DN200CF Inlet	B75100100
STPA1603CV TMS ISO200F Inlet	PT4616004
STPA1603CV TMS DN200CF Inlet	PT4616005
Accessories & Spares	Order No.
SCU-800 Control unit	YT49Z2Z00
Connection Cable 10m	B75130060
Connection Cable 5m	B75130020
Power Cable 10m	PT49Y0A01
Power Cable 5m	PT49Y0A00

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STPA2203C Turbomolecular Vacuum Pump

Edwards STPA2203C is a new turbomolecular pump designed for use in semiconductor applications. It has advanced rotor technology that gives class-leading performance for maximum process flexibility. A new half rack controller gives additional space savings and incorporates d.c. drive technology for battery-free operation. The STPA2203C has been approved for use by major etch, ion implant and deposition equipment manufacturers in the semiconductor and magnetic media industries.

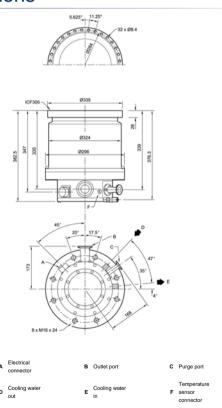


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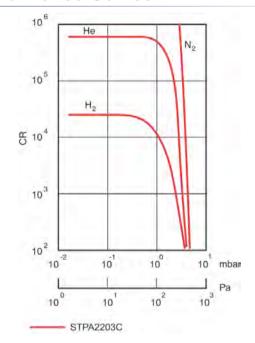
- · Advanced rotor design
- Higher gas throughput
- Maximized process flexibility
- 5 Axis Magnetic Suspension System
- Zero contamination

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO250F
Outlet port KF40
Purge port KF10
Water cooling fitting PT1/4

Pumping Speed

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 N_2 2200 l s⁻¹ H_2 1700 l s⁻¹

Compression ratio

 N_2 $<10^8$ H_2 $<2.5 \times 10^4$ Ultimate pressure 10^{-6} Pa $(10^{-8}$ Torr)

Maximum allowable backing 400 Pa (3 Torr)

Maximum Nitrogen throughput 1500 sccm
Rated speed 27000 rpm
Starting time 7 min
Mounting position Any

Water cooling

Flow 2 I min^{-1} Temperature 5-25 °C

Pressure $2.9 \times 10^5 \text{ Pa } (3 \text{ kgf cm}^{-1})$

Recommended purge gas flow 20 sccm

Input voltage 200 to 240 V a.c. (± 10)

Power consumption 1.5 kVA

Weight

Pump 61 kg Controller 12 kg

Product Description	Order No.
STPA2203C ISO250F Inlet	PT4V0Z002
STPA2203C DN250CF Inlet	PT4V0Z003
STPA2203CV TMS ISO250F Inlet	PT4V66001
STPA2203CV TMS DN250CF Inlet	PT4V66002
Accessories & Spares	Order No.
SCU-1400 Control unit	YT72Z0Z00
10m TMS connection cable kit	PT351V001
15m TMS connection cable kit	PT351V002
5m TMS connection cable kit	PT351V000
Connection Cable 10m	B75030040
Connection Cable 5m	B75030010
Power Cable 10M	PT35Y0A00
Power Cable 5m	B75030020

STP-XA2703 Turbomolecular Pump

The STP-XA2703C turbo pump offers high performance in the process range of high vacuum to 2300 sccm process flow with enhanced throughput for all gases.

This pump is based on a new platform design offering features to improve thermal management, which enhances performance on harsh processes, increases the maximum process flow capability and reduces the effects of corrosion and deposition.

The outstanding performance is suited to both light and harsh applications, such as semiconductor etch, implant, lithography and LCD processes.



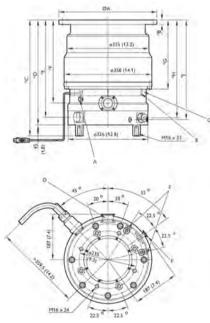
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Features & Benefits

- Advanced rotor design
- Increased H₂, N₂ and Ar performance
- Improved performance in the process pressure range of high vacuum to 2300 sccm
- Maintenance free
- 5-axis magnetic suspension system

Dimensions

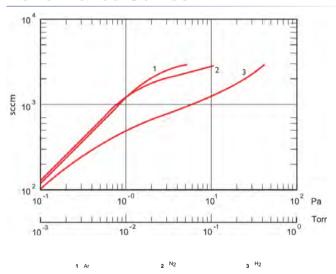


Port Flange	VG250	ISO250F	ICF305 (DN250CF)
ØA	350 (13.8)	335 (13.2)	305 (12.0)
*B	15 (0.6)	15 (0.6)	28 (1.1)
*C	454 (17.9)	454 (17.9)	459 (18.1)
*D	409 (16.1)	409 (16.1)	414 (16.3)
*E	377.5 (14.9)	377.5 (14.9)	383 (15.1)
*F	319 (12.6)	319 (12.6)	325 (12.8)
*G	262 (10.3)	262 (10.3)	267 (10.5)
*H	379.5 (14.9)	379.5 (14.9)	385 (15.2)
*]	387 (15.2)	387 (15.2)	393 (15.5)

mm (inch)

Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



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Compression ratio

 N_2 $<10^8$ H_2 $<6 \times 10^3$ Ultimate pressure 10^{-7} Pa Maximum allowable backing pressure 266 Pa

Maximum allowable gas flow

N₂ (water cooled) 2300 sccm (3.8 Pa m³/s)
Ar (water cooled) 1900 sccm (3.2 Pa m³/s)

Rated speed 27500 rpm Starting time 8 min

Mounting position Any orientation

Water cooling

Flow 3 I min⁻¹

Temperature 5-25 °C (41-77 °F)

Pressure 0.3 MPa

Recommended purge gas flow $50 \text{ sccm } (8.4 \text{ x } 10^{-2} \text{ Pa m}^3/\text{s})$ Input voltage $200 \text{ to } 240 \text{ V a.c. } (\pm 10)$

Power consumption 1.5 kVA

Weight

Pump 75 kg (165 lb) Controller 12 kg (26.4 lb)

Product Description	Order No.
STP-XA2703C VG250	PT660Z110
STP-XA2703C ISO250	PT660Z140
STP-XA2703C DN250CF	PT6610010

STP-XA3203 Turbomolecular Pump

The STP-XA3203C turbo pump offers high performance in the process range of high vacuum to 2300 sccm process flow with enhanced throughput for all gases.

This pump is based on a new platform design offering features to improve thermal management, which enhances performance on harsh processes, increases the maximum process flow capability and reduces the effects of corrosion and deposition.

The outstanding performance is suited to both light and harsh applications, such as semiconductor etch, implant, lithography and LCD processes.



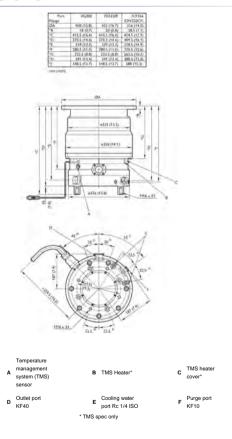
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Features & Benefits

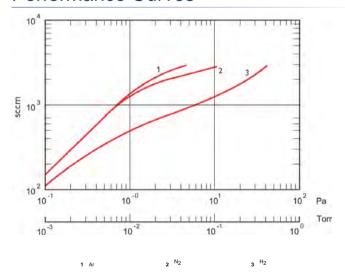
- · Advanced rotor design
- Increased H₂, N₂ and Ar performance
- Improved performance in the process pressure range of high vacuum to 2300 sccm
- Maintenance free
- 5-axis magnetic suspension system

Dimensions



Applications

- Plasma etch (chlorine, fluorine and bromine chemistries) for metal (aluminum), tungsten and dielectric (oxide) and polysilicon
- Electron cyclotron resonance (ECR) etch
- Film deposition CVD, PECVD, ECRCVD, MOCVD
- Sputtering
- Ion implantation source, beam line pumping end station



Inlet flange ISO320F Pumping Speed

 N_2 3200 Is⁻¹ H_2 2300 Is⁻¹

Compression ratio

 N_2 <10 8 H $_2$ <6 x 10 3 Ultimate pressure 10 $^{-7}$ Pa Maximum allowable backing pressure 266 Pa

Maximum allowable gas flow

 N_2 (water cooled) 2300 sccm (3.8 Pa m^3/s) Ar (water cooled) 1900 sccm (3.2 Pa m^3/s)

Rated speed 27500 rpm Starting time 8 min

Water cooling

Flow 3 I min⁻¹

Temperature 5-25 °C (41-77 °F)

Pressure 0.3 MPa

Recommended purge gas flow $50 \text{ sccm } (8.4 \times 10^{-2} \text{ Pa m}^3/\text{s})$ Input voltage $200 \text{ to } 240 \text{ V a.c. } (\pm 10)$

Power consumption 1.5 kVA

Weight

Pump 80 kg (176 lb)
Controller 12 kg (26.4 lb)

Ordering Information

Product Description	Order No.
STP-XA3203C ISO320F	PT660Z050
STP-XA3203C DN320CF	PT660Z080
STP-XA3203C VG300	PT660Z150

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The STP-XA4503C magnetic bearing turbomolecular pump has a wide process window, from high vacuum, to high flow requirements with enhanced throughput for all gases.

This pump is based on a new design, offering features to improve thermal management, which enhances performance on harsh processes, increases the maximum process flow capability and reduces the effects of corrosion and deposition.

It has been designed to handle light and harsh duty applications, such as etch, implant, lithography and FPD processes.



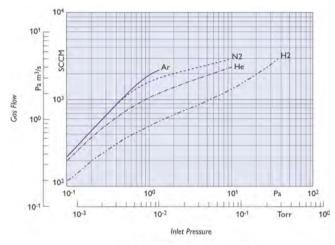
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Features & Benefits

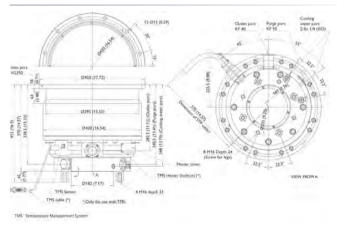
- Advanced Rotor Design
- Increased Argon performance
- Highest pumping speed in its class
- Wide process window
- Higher throughput at lower pressure

Performance Curves



P-Q characteristics of STP-4503C series

Dimensions



Product Description	Order No.
STP-XA4503C ISO320F Inlet	YT670Z040
Accessories & Spares	Order No.
Connection Cable 5m	B75030010
Connection Cable 10m	B75030040
Power Cable 5m	B75030020
Power Cable 10M	PT35Y0A00
SCU-1500 Control unit	PT59Z0Z00

Inlet flange size VF300, ISO320F, VG350

KF40 Backing port size

Pumping speed

3800 to 4300

 N_2 Litres/second(dependant on

model)

 H_2 2500 Litres/second

Compression ratio

 N_2 <10⁸ H_2 6 x 10³

10⁻⁷ Pa / 10⁻⁹ mbar Ultimate pressure Maximum allowable backing 266 Pa / 2.66 mbar pressure

Maximum allowable gas flow*1

2800 sccm / 4.73 Pa m³/s N₂(Water cooled only)

Maximum allowable gas flow*1 Ar(Water cooled only)

2150 sccm / 3.63 Pa m³/s

Rated speed 24000 rpm Run up time to 90% rated speed 12 minutes Mounting position Any orientation

Water cooling

3 Litres / minutes Flow 5 – 25 °C / 41 – 77 °F Temperature

3 Kgf/cm² Pressure

Recommended purge gas flow

 $50 \text{ sccm} / 8.4 \times 10^{-2} \text{ Pa m}^3/\text{s}$

1.5 KVA

Input voltage 200 - 240 +/- 10 % ac V

Maximum input power (without

SCU-800 Control unit

The Edwards SCU800 turbo pump control unit is a fully digital controller, and has perfect compatibility for middle sized pumps. New AVR (Auto vibration reduction) technology achieves a further reduction in vibration levels, and the advanced pre-maintenance call function provides advanced notice of precise maintenance time.

The reliability focused design, enhanced communication function, and perfect compatibility bring significant back up units savings and contributes to a reduction in total C₀O.



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Features & Benefits

- Universal Controller
- Single controller is used for middle sized pumps. No requirement for different controllers for each pump type
- Service back up stocks will be reduced
- Advanced Pre-maintenance Function
- AVR (Auto Vibration Reduction) minimizes the rotate system vibration during acceleration.

Technical Data

Magnetic bearing control system Digital control

Input voltage 100 - 120 V a.c. ±10

200 - 240 V a.c. ±10

Power consumption (without

Temperature Management

System, TMS)

Max 850 VA

Power consumption (with TMS) Max 1200 VA Input frequency 50/60 Hz ±2 Leak current 3.5 mA Main breaker rated current 10 A Motor drive system 3-phase DC

Allowable ambient temperature 0 to 40 °C (32 to 104 °F)

Weight 8.5 kg TMS control unit Built-in Serial communication function Standard (RS232/RS485)

LCD Panel display

Applications

- Applicable Models
- STP603/1003 series
- STPH301/H451 series
- STPH803/H1303 series
- STPA803C/A1303 series

Product Description	Order No.
SCU-800 Turbo Pump Control Unit	YT49Z2Z00

SCU-1400/1500 Control Units

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The fully digital SCU-1500 turbo pump control unit is compatible with STP turbo pumps ranging from 2000 Is to 3500 Is. The SCU-1500 provides reliability, enhanced communication and pump compatibility with reduced back-up unit requirements and minimized overall cost of ownership.

Features & Benefits

- Advanced pre-maintenance function
- Precise maintenance timing
- Two stage warning messages
- Rotor imbalance monitoring
- · Back-up bearing damage monitoring

Technical Data

Magnetic bearing control system Digital control

200 - 240 V a.c. ±10 Input voltage

Power consumption (without

Temperature Management System, TMS)

Max 1500 VA

Power consumption (with TMS) Max 2100 VA Input frequency 50/60 Hz ±2 Leak current 3.5 mA Main breaker rated current 15 A 3-phase DC Motor drive system

0 to 40 °C (32 to 104 °F) Allowable ambient temperature

Weight 12 kg

TMS control unit Serial communication function

(RS232/RS485)

Built-in Standard

Operation switch

Start, Stop, Reset, Select, Up, Down, Enter, Manual/Remote

Panel display LCD

Applications

- The following turbomolecular pump models:
- STP-A2203/2503/2803/3003/3503
- STP-F2203
- STP-XA2703/3203
- STP-XH2603/3203

Product Description	Order No.
SCU-1500 Turbo Pump Control Unit	PT59Z0Z00
SCU-1400 Turbo Pump Control Unit	YT72Z0Z00

Vapor Pumps







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High Throughput Diffusion Pumps	96
Vapor Booster Pumps	102
Diffstak Vapor Pumps	107
EO Series Vapor Pumps	118



HT10 high throughput vapor pump

Edwards' vapor pumps suit the widest range of applications, as we offer the most comprehensive range of pumps and accessories available from any supplier.

Our industrial, high throughput diffusion pumps and vapor booster pumps fulfil the requirements of applications like vacuum metallurgy, distillation and coating.

Our compact scientific pumps are designed for instrument and general R&D applications.

By matching the pump of your choice with appropriate accessories, we offer a complete high vacuum pumping solution for all applications.

Pumping Speed and Throughput

The pumping speed (volume flowrate) of a vapor pump is the volume of gas and vapor passing through the inlet of the pump in one second. The unit of measurement is I s $^{-1}$. The throughput (mass flowrate) is the mass of gas passing through the pump in one second and is measured in mbar I s $^{-1}$. The throughput of the pump is the same at the pump inlet and pump outlet.

At a given pressure, pumping speed (S) and throughput (Q) are related by the simple equation: $Q = P \times S$, where P is the pressure. You can use this equation to convert between pumping speed and throughput measurements.

Below about 1 × 10⁻³ mbar, pumping speed is the most convenient measure of the pump's performance. At these pressures, the pumping speed is proportional to the diameter of the pump inlet: a large pump is required to obtain higher pumping speeds. Above about 1 × 10⁻³ mbar, the pump's throughput is most often used to characterize its performance. At these pressures, the performance of the pump is affected by its internal construction as well as its overall size.

To choose the best type of vapor pump for your application, you must define the operation pressure and the pumping speed (or throughput) requirement of your application and match these to the performance characteristics of our range of vapor pumps. Remember that, when you calculate the required pumping speed, you must include provision for the process gas throughput, the outgassing of the vacuum system and the leakage into the system. You may also have to consider how quickly you want to achieve the operation pressure.

Measurement Methods

The methods used to measure pressure and flow have become more accurate in recent years allowing much tighter controls over system conditions. The speeds and throughputs quoted in the catalog for the HT diffusion pumps are based on actual pump data derived from measurements made with the latest technology total pressure gauges and mass flow transducers in accordance with ISO standards.

Some confusion could arise with previously published speed and throughput figures for older designed pumps where, historically, pressure measurements were made with partial pressure gauges like the McLeod gauge. This older gauge can indicate speeds up to 30% higher than that expected using state of the art total pressure gauges. Further confusion could arise from the measurement standards chosen to determine pumping performance. In the case of AVS (American Vacuum Society), this can indicate speeds and throughput up to 15% higher than ISO figures.

Historical industry practice meant that in considering the above, and potential gauge accuracy of \pm 15%, it was possible to have speeds quoted 60% higher than might be expected using modern total pressure measurement equipment. This should be carefully considered when comparing specifications for older derived data published for similarly sized competitor pumps and the Edwards HT diffusion pumps.

Ultimate Vacuum

The ultimate vacuum of a vapor pump is the lowest pressure achieved in tests on the pump, measured above the inlet of the pump (or above the high vacuum valve for the Diffstaks). The ultimate vacuum depends on: the type of fluid used in the pump; the temperature of the inlet baffle; the amount of outgassing from the vacuum system; and the amount of leakage into the system.

Critical Backing Pressure

The critical backing pressure is the highest pressure that a pump can tolerate in the backing line. If the pressure is higher than the critical backing pressure, the pump may stall. The critical backing pressure depends on: the pump design; the power of the heaters; and the fluid used in the vapor pump.

Backstreaming

Backstreaming is the direct movement of molecules of pump fluid vapor from the pump toward the vacuum system. All Edwards pumps are specially designed to minimize backstreaming; the pumps have a guard ring (sometimes called a cool-cap) fitted above the top jet. The guard ring condenses vapor molecules moving from the top jet toward the vacuum system.

In some sensitive applications, backstreaming may be very undesirable; you can minimize backstreaming if you fit a baffle or a trap to the top of the pump.

Accessories

Accessories for vapor pumps include thermal snap-switches, baffles, traps and special isolation valves. For our range of HT pumps we also offer a thermal probe to measure the pump temperature, a heat shield to protect you from the hot surfaces of the pump base and an inlet baffle to reduce backstreaming.

Baffles (fitted between the pump and the vacuum system) are used to reduce the amount of pump fluid vapor backstreaming into your vacuum system.

Vapor Pumps for Industrial Applications

Edwards has long been a pioneer of vapor pumps and diffusion pump technology with innovations such as the diffusion pump cold cap and the combined diffusion pump, the Diffstak.

Edwards's range of high throughput diffusion pumps have many advantages in industrial applications. High throughput gives high pumping speeds at high pressures, earlier cross over from backing pump set to the diffusion pump, thus reducing pump down time to process pressure. A high tolerance to gas surges and high critical backing pressures are additional benefits of this range of pumps. The pumps, in back to back testing, are comparable to the best leading competition but also incorporating the above benefits.

To offer even higher pumping speeds, of up to 45000 m³h⁻¹ at pressures intermediate between mechanical boosters and diffusion pumps Edwards can supply our industrially proven vapor booster pumps. Vapor boosters from Edwards have been proven in the field for over 30 years. A constant program of updates and improvements, with input from OEM's and end users, ensures that the vapor boosters always meet the requirements of the industry. This combined with inherent reliability, ease of use, ease of maintenance and tolerance to a wide range of inlet and exhaust pressures means they have been used extensively in metallurgy and coating industries as well as many other specialist applications.

- Vacuum metallurgy
- · Distillation, drying and degassing
- · Thin film coating and metallizing
- · Large scale research

Industrial applications require a robustly designed and constructed vapor pump often with very high throughputs. Edwards provides a complete range of vapor diffusion pumps and vapor boosters to meet these needs. All industrial diffusion pumps are water-cooled.

HT Series Pumps

These pumps are designed to give high throughput (pressure multiplied by pumping speed) at 4 x 10^{-3} mbar making them ideal for industrial processes that evolve large quantities of gases. Their high critical backing pressure means that they are more tolerant to sudden increases in load. They are particularly suitable for large coating systems and furnaces.

All Edwards vapor diffusion pumps are fully fractionating. This means that volatile components are fed to the lower stages of the vapor pump and the vapor fed to the inlet stage is stripped of these fractions and this improves the ultimate vacuum performance of the pump. Conduction cooled baffles above the pump help to prevent pump fluid migration into the vacuum system, which would prevent the pump achieving its ultimate vacuum. Baffles also ensue that backstreaming is minimized.

The outgassing from the system, its leak tightness, the vapor pressure of the pump fluid and the number of joints and elastomers used for seals all contribute to the pump down time and ultimate vacuum achievable. Ultimate vacuum is a function of the vapor pressure of the pump fluid selected, at a particular temperature, and in most industrial applications the pump's throughput at a particular pressure is more important than obtaining a very high ultimate vacuum. For these reasons we have elected not to quote an ultimate vacuum for our industrial vapor diffusion pumps, since it would not provide a useful measure of their performance.

By combining Edwards vapor diffusion pumps with either our GV series dry pump combinations or our oil-sealed rotary pump combinations fast pump-down and process times are achievable. Our applications specialists are able to recommend suitable pump combinations to meet specific process requirements.

Vapor Booster Pumps

Vapor booster pumps operate in a similar way to vapor diffusion pumps but generate boiler pressures approximately ten times higher than is typical for a vapor diffusion pump. The high boiler pressure feed supplies powerful ejector nozzles, that are specifically designed to increase further the throughput of the pump. The ultimate pressure of these pumps is typically in the range 10⁻⁴ to 10⁻⁵ mbar, above which the pumps exhibit considerable pumping speed for permanent gases. Additionally, they are tolerant to high backing pressures. Vapor boosters are typically used in the 10⁻¹ to 10⁻⁴ mbar range where primary pump combinations are often at their limit and ordinary diffusion pumps exhibit instability.

Edwards booster pumps are particularly tolerate to pumping contaminated systems and processes with high gas loads of hydrogen, hence their suitability for use in metallurgical and chemical process applications.

By combining Edwards vapor booster pumps with either our GV series dry pump combinations or our oil-sealed rotary pump combinations fast pump-down and process times are achievable. Our applications specialists are able to recommend suitable pump combinations to meet specific process requirements.

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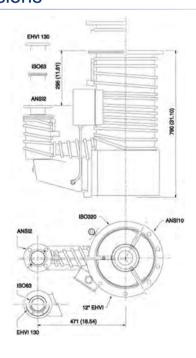
The HT high throughput series is the pinnacle of our diffusion pump knowledge with technology aimed specifically at industrial users.

Edwards HT10 (ANSI10/ISO320 inlet) diffusion pump is designed for all light and heavy duty industrial applications. The robust construction gives high pumping speed at high pressure. The cast and machined aluminium interior provides consistent performance, while the stainless steel body prevents corrosion and ensures process cleanliness. These pumps are designed to give a high throughput (pressure multiplied by pumping speed) at 4×10^3 mbar making them ideal for industrial processes that involve large quantities of gases.



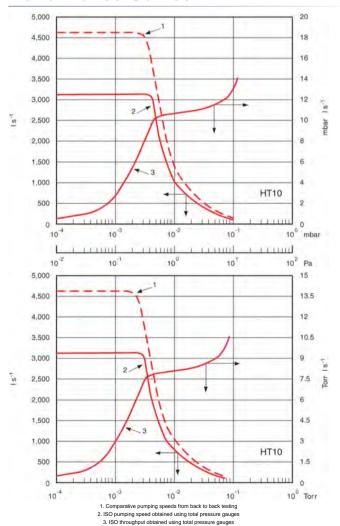
- Highest throughput of comparative sized pumps
- · Earliest crossover pressure of similar sized pumps
- Excellent maximum backing line pressure and tolerance to gas surges
- · Comparative pumping speed to similar sized pumps
- Integral cold cap for best performance and low backstreaming

Dimensions



Applications

- Vacuum metallurgy
- Distillation, drying and degassing
- Thin film coating and metallizing
- Large-scale research



B31103220

B31103380

B31103400

B31103415

B31103480

Technical Data

Comparative pumping speed	4650 l s
ISO pumping speed†	
Nitrogen	3000 l s ⁻¹
Helium	4650 l s
AVS pumping	
Nitrogen	3330 l s ⁻¹
Helium	5165 l s ⁻¹
Maximum throughput (nitrogen)	10 mbar l s
	7.5 Torr I s ⁻¹
Critical backing pressure (DC704EU)	1.1 mbar
(/	0.8 Torr
Minimum backing pump displacement for maximum throughput	60 m ³ h ⁻¹
	35 ft min -1
Recommended backing pump‡	GV80, E2M80
Recommended fluid	DC704EU
Fluid charge (dry)	1250 ml
	1.3 qt
Inlet/backing connection	ANSI10/ANSI12 or EO12 inch/EO130 mm or ISO320/ISO63
Water connection	3/8 inch NPT female
Heater power	5.1 kW
	6.8 hp
Warm up time	30 min
Minimum cooling water flow at 25°C	400 I h ⁻¹
	1.8 US gal min ⁻¹
Pressure drop across cooling water supply	1 bar
	14.5 psi
Weight	80 kg
	176 lbs

† ISO speed and throughout data obtained with total pressure measurement. Partial pressure readings typically increase data by ~30%. ISO speed measurements are typically 10 less than AVS measurements for the same pump.

‡ These are given for guidance, please contact Edwards for a recommendation of pump combinations best suited to your application.

Product Description Order No. HT10 ANSI10/ANSI2, 415V B31101415 HT10 ANSI10/ANSI2, 200V B31101200 HT10 ANSI10/ANSI2, 220V B31101220 HT10 ANSI10/ANSI2, 380V B31101380 HT10 ANSI10/ANSI2, 400V B31101400 HT10 ANSI10/ANSI2, 460V B31101460 HT10 ANSI10/ANSI2, 480V B31101480 HT10 EO12/EHVI130, 200V B31102200 HT10 EO12/EHVI130, 220V B31102220 HT10 EO12/EHVI130, 380V B31102380 HT10 EO12/EHVI130, 400V B31102400 HT10 EO12/EHVI130, 415V B31102415 HT10 ISO320/ISO63, 200V B31103200

Ordering Information

HT10 ISO320/ISO63, 220V

HT10 ISO320/ISO63, 380V

HT10 ISO320/ISO63, 400V

HT10 ISO320/ISO63, 415V

HT10 ISO320/ISO63, 480V

application.

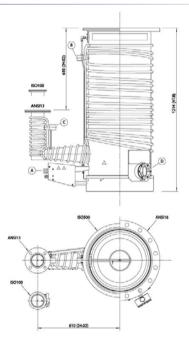
The HT high throughput series is the pinnacle of our diffusion pump knowledge with technology aimed specifically at industrial users.

Edwards HT16B (ANSI16/ISO5000 inlet) diffusion pump is designed for all light and heavy duty industrial applications. The robust construction gives high pumping speed at high pressure. The cast and machined aluminium interior provides consistent performance, while the stainless steel body prevents corrosion and ensures process cleanliness. These pumps are designed to give a high throughput (pressure multiplied by pumping speed) at 4×10^3 mbar making them ideal for industrial processes that involve large quantities of gases.

Features & Benefits

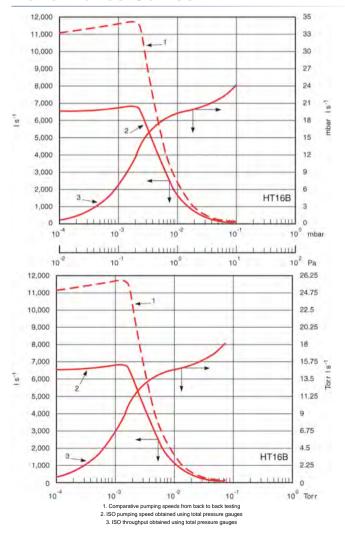
- Highest throughput of comparative sized pumps
- · Earliest crossover pressure of similar sized pumps
- Excellent maximum backing line pressure and tolerance to gas surges
- Comparative pumping speed to similar sized pumps
- Integral cold cap for best performance and low backstreaming

Dimensions



Applications

- Vacuum metallurgy
- Distillation, drying and degassing
- Thin film coating and metallizing
- · Large-scale research



B31222480

Technical Data

Comparative pumping spe	eed 11580 l s ⁻¹
ISO pumping speed†	
Nitrogen	6500 l s ⁻¹
Helium	7200 l s ⁻¹
AVS pumping	
Nitrogen	7220 l s ⁻¹
Helium	8000 l s ⁻¹
Maximum throughput (nitr	4 4
Critical backing pressure (DC704EU)	1.4 mbar / 1 Torr
Min backing pump displact for max throughput	ement 3 -1 / 55 ft min -1
Recommended backing p	ump‡ GV80, GV260M, E2M175
Recommended fluid	DC704EU
Fluid charge (dry)	2400 ml / 2.5 qt
Inlet/backing connection	ANSI16/ANSI3 or ISO500/ISO100
Water connection	3/4 inch NPT female
Heater power	9 kW / 12 hp
Warm up time	60 min
Minimum cooling water flo 25°C	ow at 700 l h ⁻¹ / 3.1 US gal min ⁻¹
Pressure drop across coo water supply	ling 1 bar / 14.5 psi
Weight	185 kg / 408 lbs

[†] ISO speed and throughout data obtained with total pressure measurement. Partial pressure readings typically increase data by ~30%. ISO speed measurements are typically 10% less than AVS measurements for the same pump.

‡ These are given for guidance, please contact Edwards for a recommendation of pump combinations best suited to your application.

Order No. **Product Description** HT16B ANSI16/ANSI3, 200V B31220200 HT16B ANSI16/ANSI3, 220V B31220220 HT16B ANSI16/ANSI3, 380V B31220380 HT16B ANSI16/ANSI3, 400V B31220400 HT16B ANSI16/ANSI3, 415V B31220415 HT16B ANSI16/ANSI3, 440V B31220440 HT16B ANSI16/ANSI3, 460V B31220460 HT16B ANSI16/ANSI3, 480V B31220480 HT16B ISO500/ISO100, 200V B31222200 HT16B ISO500/ISO100, 220V B31222220 HT16B ISO500/ISO100, 380V B31222380 HT16B ISO500/ISO100, 400V B31222400 HT16B ISO500/ISO100, 415V B31222415 HT16B ISO500/ISO100, 440V B31222440 HT16B ISO500/ISO100, 460V B31222460

Ordering Information

HT16B ISO500/ISO100, 480V

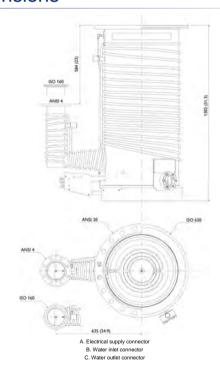
The HT high throughput series is the pinnacle of our diffusion pump knowledge with technology aimed specifically at industrial users.

Edwards HT20B (ANSI20/ISO630 inlet) diffusion pump is designed for all light and heavy duty industrial applications. The robust construction gives high pumping speed at high pressure. The cast and machined aluminium interior provides consistent performance, while the stainless steel body prevents corrosion and ensures process cleanliness. These pumps are designed to give a high throughput (pressure multiplied by pumping speed) at 4×10^3 mbar making them ideal for industrial processes that involve large quantities of gases.

Features & Benefits

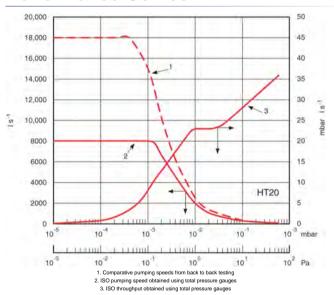
- Highest throughput of comparative sized pumps
- Earliest crossover pressure of similar sized pumps
- Excellent maximum backing line pressure and tolerance to gas surges
- Comparative pumping speed to similar sized pumps
- Integral cold cap for best performance and low backstreaming

Dimensions



Applications

- Vacuum metallurgy
- · Distillation, drying and degassing
- . Thin film coating and metallizing
- Large-scale research



Comparative pumping speed	18000 l s ⁻¹
ISO pumping speed†	
Nitrogen	8000 l s ⁻¹
Helium	16000 I s ⁻¹
Max throughput (nitrogen)	24 mbar s ⁻¹ / 18 Torr s ⁻¹
Critical backing pressure (DC704EU)	1.3 mbar / 1 Torr
Min backing pump displacement for max throughput	135 m ³ h ⁻¹ / 80 ft ³ min ⁻¹
Recommended backing pump‡	GV160M, E2M175
Recommended fluid	DC704EU
Fluid charge (dry)	3600 ml / 3.8 qt
Inlet/backing connection	ANSI20/ANSI4 or ISO630/ISO160
Water connection	3/4 inch NPT female
Heater power	12.6 kW / 16.9 hp
Warm up time	60 min
Minimum cooling water flow at 25°C	960 I h ⁻¹ / 4.2 US gal min ⁻¹
Pressure drop across cooling water supply	1.2 bar / 17.4 psi
Weight	275 kg / 605 lbs

[†] ISO speed and throughout data obtained with total pressure measurement. Partial pressure readings typically increase data by ~30%. ISO speed measurements are typically 10% less than AVS measurements for the same pump.

‡ These are given for guidance, please contact Edwards for a recommendation of pump combinations best suited to your application.

Product Description	Order No.
HT20B ANSI20/ANSI4, 200V	B31420200
HT20B ANSI20/ANSI4, 220V	B31420220
HT20B ANSI20/ANSI4, 380V	B31420380
HT20B ANSI20/ANSI4, 400V	B31420400
HT20B ANSI20/ANSI4, 415V	B31420415
HT20B ANSI20/ANSI4, 440V	B31420440
HT20B ANSI20/ANSI4, 460V	B31420460
HT20B ANSI20/ANSI4, 480V	B31420480
HT20B ISO630/ISO160, 200V	B31422200
HT20B ISO630/ISO160, 220V	B31422220
HT20B ISO630/ISO160, 380V	B31422380
HT20B ISO630/ISO160, 400V	B31422400
HT20B ISO630/ISO160, 415V	B31422415
HT20B ISO630/ISO160, 440V	B31422440
HT20B ISO630/ISO160, 460V	B31422460
HT20B ISO630/ISO160, 480V	B31422480

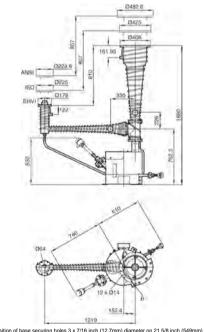


The Edwards 18B4B vapour booster pumps offer higher pumping speeds, of up to 6000 I s⁻¹ at pressures intermediate between mechanical boosters and diffusion pumps. Vapor boosters from Edwards have been proven in the field for over 30 years. With a constant program of updates and modernization, with input from OEM's and end users, combined with inherent reliability, ease of use and tolerance to various inlet and exhaust pressures they have been used extensively in metallurgy and coating industries as well as other specialist applications.

Features & Benefits

- Very large pumping speed at high operating pressures
- Very high throughput at operating pressures
- Quick crossover for excellent pumpdown times
- Industry proven for over 40 years
- Excellent reliability

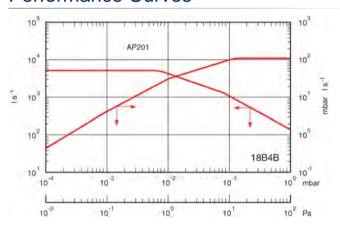
Dimensions



B. Position of base securing holes 3 x 7/16 inch (12.7mm) diameter on 21 5/8 inch (549mm) p.c.d.

Applications

- Vacuum metallurgy
- Distillation, drying and degassing
- Thin film coating and metallizing
- Large-scale research



B06530480

Technical Data

Pumping speed (air)	4000 l s ⁻¹
Pumping speed (hydrogen)	6000 I s ⁻¹
Maximum throughput	100 mbar s ⁻¹ / 75 Torr s ⁻¹
Critical backing pressure (with AP201 fluid)	2-2.6 mbar / 1.5-2 Torr
Recommended backing pump displacement	190 m ³ h ⁻¹ / 112 ft ³ min ⁻¹
Recommended backing pump	GV400, E1M275
Recommended fluid	Apiezon® AP201
Fluid charge	10 liter / 9.5 qt
Inlet connection	8x11mm holes on 387.4 PCD (Edwards) / ANSI 12 inch / ISO320
Backing connection	2 inch union (Edwards) / ANSI inch / ISO160
Water connection	-
Heater power	6.0 kW / 8 hp
Warming up time for full performance at	
maximum heater input	60 min
Minimum water flow inlet	375 I h ⁻¹ @ 20°C / 1.8 US gal min ⁻¹ @ 20°C
Water block threaded hole	½ inch BSP
Weight	165 kg / 365 lbs

Ordering Information	
Product Description	Order No.
18B4B, Edwards, 200-210V	B06510200
18B4B, Edwards, 220-230V	B06510220
18B4B, Edwards, 240-250V	B06510240
18B4B, Edwards, 380-440V	B06510380
18B4B, ANSI, 200-210V	B06520200
18B4B, ANSI, 220-230V	B06520220
18B4B, ANSI, 240-250V	B06520240
18B4B, ANSI, 380-440V	B06520380
18B4B, ANSI, 415-440V	B06520440
18B4B, ANSI, 460-480V	B06520480
18B4B, ISO, 200-210V	B06530200
18B4B, ISO, 220-230V	B06530220
18B4B, ISO, 240-250V	B06530240
18B4B, ISO, 380-440V	B06530380
18B4B, ISO, 415-440V	B06530440

18B4B, ISO, 460-480V

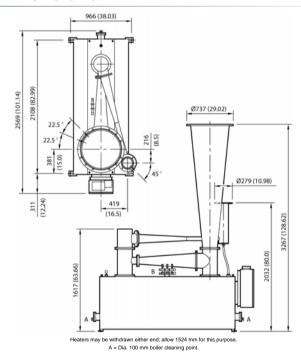


The Edwards 30B5M vapor booster pumps offer higher pumping speeds, of up to 15000 l s⁻¹ at pressures intermediate between mechanical boosters and diffusion pumps. Vapor boosters from Edwards have been proven in the field for over 30 years. With a constant program of updates and modernization, with input from OEM's and end users, combined with inherent reliability, ease of use and tolerance to various inlet and exhaust pressures they have been used extensively in metallurgy and coating industries as well as other specialist applications.

Features & Benefits

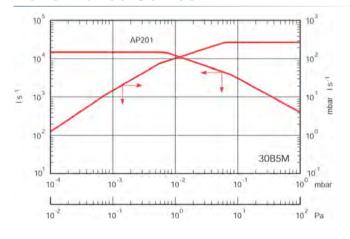
- Very large pumping speed at high operating pressures
- Very high throughput at operating pressures
- Quick crossover for excellent pumpdown times
- Industry proven for over 40 years and continuously updated to suit OEM and end-user requirements
- Excellent reliability

Dimensions



Applications

- Vacuum metallurgy
- · Distillation, drying and degassing
- Thin film coating and metallizing
- Large-scale research



Pumping speed (air)	12500 l s
Pumping speed (hydrogen)	15000 l s ⁻¹
Maximum throughput	300 mbar s ⁻¹ / 225 Torr s ⁻¹
Critical backing pressure (with	5.3-6 mbar / 4-4.5 Torr

Critical backing pressure (with AP201 fluid)

Recommended backing pump displacement

Recommended backing pump† Recommended fluid Fluid charge

Inlet connection 12 x 20.60 holes on 686.0 PCD Backing connection 4 x 16.70 holes on 235.0 PCD

290 m³h⁻¹ / 171 ft³min⁻¹

GV400, E1M275

Apiezon® AP201

55 liter / 52 qt

Water connection 1 inch BSP Heater power 22.5 kW / 30 hp

Warming up time for full performance at

Weight

60 min maximum heater input

2250 l h $^{-1}$ @ 20°C / 9.9 US gal Minimum water flow inlet

min⁻¹ @ 20°C 620 kg / 1367 lbs

Product Description	Order No.
30B5M, 380V, 3Ø, 50/60 Hz with Terminal Box	B06407380
30B5M, 400V, 3Ø, 50/60 Hz with Terminal Box	B06407400
30B5M, 415V, 3Ø, 50/60 Hz with Terminal Box	B06407415
30B5M, 440V, 3Ø, 50/60 Hz with Terminal Box	B06407440
30B5M, 460V, 3Ø, 50/60 Hz with Terminal Box	B06407460
30B5M, 480V, 3Ø, 50/60 Hz with Terminal Box	B06407480

[†] These are given for guidance, please contact Edwards for a recommendation of pump combinations best suited for your application.

Vapor Pumps for Scientific Instruments and R&D Applications

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Scientific and R&D applications require special vapor pumps and accessories. It is important to minimize any backstreaming of the vapor pump fluid, and the number of elastomer seals used in system design needs to be kept to a minimum, to give clean pumping with minimal outgassing. For bench-top or transportable instruments, compact air-cooled pumps are essential.

Edwards offers a range of vapor pumps and accessories which are designed to meet these needs.

Diffstak Vapor Diffusion Pumps

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Diffstak design has been proven over many years with thousands of pumps installed. They are supplied in three types: standard, cryo-cooled and unvalved. (C – collar model pumps).

The standard Diffstak pumps have integral high vacuum valves and water-cooled baffles. The cryo-cooled versions (CR – model pumps) have a liquid nitrogen cooled baffle supplied from a reservoir attached to the pump and are intended for pumping heavy vapor loads. Valves on both versions are supplied as either manually operated (M-model pumps) or pneumatically operated (P-model pumps). When comparing pumping speeds, note that the speeds quoted for valved Diffstaks are the speeds above the high vacuum valve, taking full account of the valve's impedance.

The unvalved Diffstaks are for systems requiring the highest possible ultimate vacuum or for those which do not need a high vacuum valve. All sizes are available with ISO flanges while two sizes are also available with CF flanges. ($F-ConFlat^{@}$ model pump).

The complete range is shown in the table below. Refer to the following pages for full technical data for each of the pumps and also for full details of installations, spares and accessories.

Standard	andard Cryo-cooled		Cryo-cooled Unvalved Diffstak		d Diffstak
Diffstak	Diffstak	ISO Flange	CF Flange		
63/150M or P	CR63/150M or P	63/150C	-		
100/300M or P	CR100/300M or P	100/300C	100/300F		
160/700M or P	CR160/700M or P	160/700C	160/700F		
250/2000M or P	CR250/2000M or P	250/2000C	_		

The following table shows the critical backing and ultimate pressures for the diffusion pump range:

	Critical Backing Pressure	Ultimate Pressure
Fluid	(mbar)	(mbar)
Santovac [®] 5	0.6	5 × 10 ⁻⁹
Silicone DC702	1.2	7×10^{-6}
Silicone DC704EU	0.8	7×10^{-8}
Silicone DC705	0.6	3×10^{-8}



EO50/60 Diffusion Pump

The EO50/60 is a compact, fast warm-up, air-cooled diffusion pump and makes a good choice for small, low-cost systems. The high helium pumping speed from a pump only 176 mm high is a particular benefit for GCMS applications.

Applications

- · Mass spectrometry
- · Gas analysis
- · Leak detection
- Thin film coating
- High vacuum systems
- Lamp evacuation
- Surface physics
- Small vacuum ovens
- · Vacuum isolation/cryo transfer

ConFlat® is a registered trademark of Varian, Inc Santovac® is a registered trademark of Santovac Fluids Inc, USA

These are compact, high performance units featuring either a 63 mm or 100mm Diffstak both backed by the RV5 two-stage rotary pump. Inlet pumping speeds above the valve are 135 l s⁻¹ and 280 l s⁻¹ respectively.

The Diffstak has an integral water cooled baffle and is fitted with manual quarterswing and backing/roughing valves. A manual air admittance valve and a Pirani gauge are fitted in the backing line to the rotary pump. The unit is supplied complete with rotary pump oil but vapor pump fluid should be selected from the fluids and sealants section. Additional gauges are optional extras.



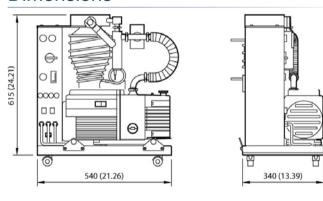
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Features & Benefits

- · High pumping speed
- Integrated manual backing/roughing system
- Manual high vacuum inlet valve combined with water cooled inlet haffle
- Active Pirani gauge head in backing line provides Diffstak interlock
- Enhanced safety shields for the highest temperature surfaces

Dimensions



Applications

- UHV systems
- Laboratory vacuum
- · Mass spectrometry and
- Thin film coating
- Surface physics

Ordering Information

Product Description	Order No.
63mm Diffstak Combined Outfit, 220V, 1Ø, 50/60Hz	B62426952
63mm Diffstak Combined Outfit, 115V, 1Ø, 50/60Hz	B62426990
63mm Diffstak Combined Outfit, 245V, 1Ø, 50/60Hz	B62426960
100mm Diffstak Combined Outfit, 245V, 1Ø, 50/60Hz	B62613960
100mm Diffstak Combined Outfit, 220V, 1Ø, 50/60Hz	B62613952
100mm Diffstak Combined Outfit, 115V, 1Ø, 50/60Hz	B62613990

Technical Data

Diffstak outfit	63mm	100mm
Pumping speed above Diffstak valve	135 s ⁻¹	280 l s ⁻¹
Ultimate vacuum (with Santovac® 5 fluid)	3 x 10 ⁻⁸ mbar	3 x 10 ⁻⁸ mbar
	3 x 10 ⁻⁶ Pa	3 x 10 ⁻⁶ Pa
Minimum cooling water flow	42 h ⁻¹	60 I h ⁻¹
Maximum power	0.8 kW	1.0 kW
Weight (approx.)	51 kg	61 kg
Vapor pump	Diffstak 63 / 150M	Diffstak 100 / 300M
Rotary vacuum pump	RV5	RV5
Backing/roughing valve	BRV10K	BRV25K
Vacuum gauge - Pirani	APG-M-NW16	APG-M-NW25

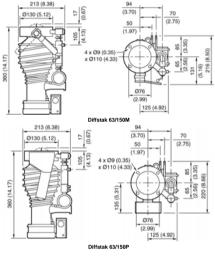


The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

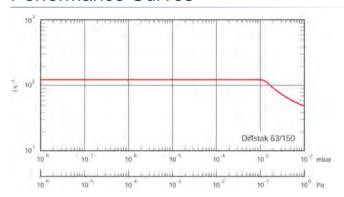
The Edwards Diffstak 63 (ISO63 inlet) design has been proven over many years with thousands of pumps installed.

This pump has a manually operated high vacuum isolation valve and is supplied with: NW10 elbow, NW10 centering-ring, NW10 clamp, water pipe couplings and ferrules, inlet ISO63 Co-Seal.

Dimensions



Performance Curves



Technical Data

135 s ⁻¹
200 l s ⁻¹
5 m h
RV5
Santovac® 5
60 ml
ISO63
NW10
6 mm compression fittings

0.45 kW Heater power Min cooling-water flow at 20°C 42 l h⁻¹

6 mm coupling x 1/4" BSP male Pneumatic connections

stud

Pneumatic actuating pressure

Minimum 2.4 bar / 35 psi 6.9 bar / 100 psi Maximum

Weight 9 kg

Product Description	Order No.
Diffstak 63/150M, 110-125V, 1-ph, 50/60Hz	B34431976
Diffstak 63/150M, 210-225V, 1-ph, 50/60Hz	B34431977
Diffstak 63/150M, 230-250V, 1-ph, 50/60Hz	B34431978
Diffstak 63/150P, 110-125V, 1-ph, 50/60Hz	B34432976
Diffstak 63/150P, 210-225V, 1-ph, 50/60Hz	B34432977
Diffstak 63/150P, 230-250V, 1-ph, 50/60Hz	B34432978

^{*} For maximum throughput. For applications where maximum throughput is not required, use an RV3.

Unvalved Diffstak 63/150C Vapor Pump

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak 63 (ISO63 inlet) design has been proven over many years with thousands of pumps installed. The unvalved Diffstak's are for systems requiring the highest possible ultimate vacuum or for those which do not need a high vacuum valve.

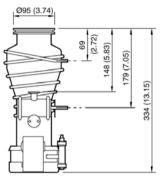
This pump has an unvalved ISO collar inlet flange and is supplied with: NW10 elbow, NW10 centering-ring, NW10 clamp, water pipe couplings and ferrules, inlet ISO 63 Co-Seal.

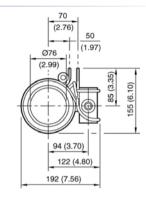


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Dimensions





Technical Data

Pumping speed

nitrogen 150 l s⁻¹
hydrogen 225 l s⁻¹
Minimum backing pump
displacement * 5 m h

displacement * 5 m

Recommended backing pump RV5

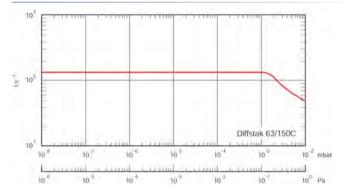
Recommended fluid Santovac® 5

Fluid charge (dry) 60 ml
Inlet connection compatible with ISO63
Backing connection NW10

Cooling water connection 6 mm compression fittings

 $\begin{array}{lll} \mbox{Heater power} & 0.45 \mbox{ kW} \\ \mbox{Minimum cooling-water flow at} & 20 \mbox{ °C} & 42 \mbox{ l h}^{-1} \\ \mbox{Weight} & 5 \mbox{ kg} \end{array}$

Performance Curves



Product Description	Order No.
Diffstak 63/150C, 110-125V, 1-ph, 50/60Hz	B34433976
Diffstak 63/150C, 210-225V, 1-ph, 50/60Hz	B34433977
Diffstak 63/150C, 230-250V, 1-ph, 50/60Hz	B34433978

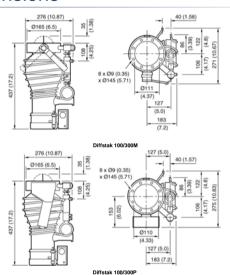
^{*} For maximum throughput

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak 100 (ISO100 inlet) design has been proven over many years with thousands of pumps installed.

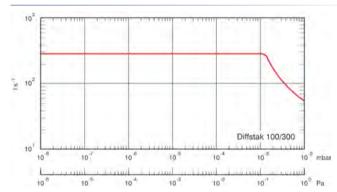
This pump has a manually operated high vacuum isolation valve and is supplied with: NW25 elbow, NW25 centering-ring, NW25 clamp, water pipe couplings and ferrules, inlet ISO 100 Co-Seal.

Dimensions



The BRV and PVK valves shown in these dimension diagrams are optional accessories.

Performance Curves



Technical Data

Pumping speed (nitrogen)	280 l s ⁻¹
Pumping speed (hydrogen)	500 l s ⁻¹
Min backing pump displacement*	5 m h -1
Recommended backing pump	RV5 or RV8
Recommended fluid	Santovac® 5
Fluid charge (dry)	125 ml
Inlet connection compatible with	ISO100
Backing connection	NW25
Cooling water connection	6 mm compression fittings
Heater power	0.65 kW

Pneumatic connections $6 \text{mm coupling x 1/4 BSP male} \ (100/300P \text{ only})$ 8 stud

60 l h

Pneumatic actuating pressure

Min cooling-water flow at 20°C

Minimum 2.4bar / 35psi
Maximum 6.9bar / 100psi
Weight

100/300M 12kg 100/300P 13kg

Product Description	Order No.
Diffstak 100/300M, 110-125V, 1-ph, 50/60Hz	B34631976
Diffstak 100/300M, 210-225V, 1-ph, 50/60Hz	B34631977
Diffstak 100/300M, 230-250V, 1-ph, 50/60Hz	B34631978
Diffstak 100/300P, 210-225V, 1-ph, 50/60Hz	B34632977
Diffstak 100/300P, 230-250V, 1-ph, 50/60Hz	B34632978
Diffstak 100/300P, 110-125V, 1-ph, 50/60Hz	B34632976

^{*} For maximum throughput

Unvalved Diffstak 100/300 Vapor Pump

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak (ISO100 inlet) design has been proven over many years with thousands of pumps installed. The unvalved Diffstak's are for systems requiring the highest possible ultimate vacuum or for those which do not need a high vacuum valve.

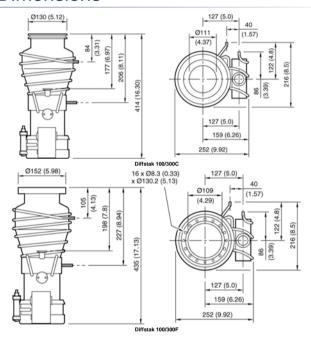
This pump has an unvalved ISO collar inlet flange and is supplied with: NW25 elbow, NW25 centering-ring, NW25 clamp, water pipe couplings and ferrules, inlet ISO Co-Seal.



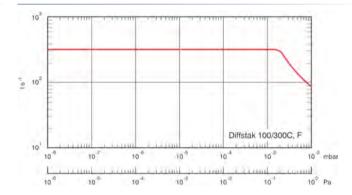
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Dimensions



Performance Curves



Technical Data

Pumping speed	
nitrogen	300 l s ⁻¹
hydrogen	535 l s ⁻¹
Min backing pump displacement*	5 m ³ h ⁻¹
Recommended backing pump	RV5 or RV8
Recommended fluid	Santovac® 5
Fluid charge (dry)	125 ml

Inlet connection compatible with

 100/300C
 ISO100

 100/300F
 6 inch

 Backing connection
 NW25

Cooling water connection 6 mm compression fittings

Heater power 0.65 kW
Min cooling-water flow at 20°C 60 I h⁻¹

Weight

100/300C 9 kg 100/300F 10 kg

Product Description	Order No.
Diffstak 100/300C, 110-125V, 1-ph, 50/60Hz	B34633976
Diffstak 100/300C, 210-225V, 1-ph, 50/60Hz	B34633977
Diffstak 100/300C, 230-250V, 1-ph, 50/60Hz	B34633978
Diffstak 100/300F, 110-125V, 1-ph, 50/60Hz	B34640976
Diffstak 100/300F, 210-225V, 1-ph, 50/60Hz	B34640977
Diffstak 100/300F, 230-250V, 1-ph, 50/60Hz	B34640978

^{*} For maximum throughput

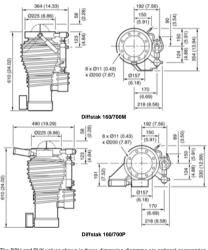


The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

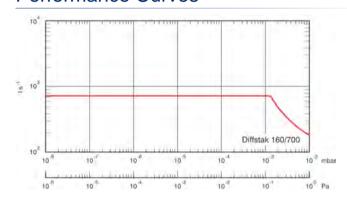
The Edwards Diffstak 160 (ISO160 inlet) design has been proven over many years with thousands of pumps installed.

This pump has a manually operated high vacuum isolation valve and is supplied with: NW25 elbow, NW25 centering-ring, NW25 clamp, water pipe couplings and ferrules, inlet ISO 160 Co-Seal.

Dimensions



Performance Curves



Technical Data

700 l s⁻¹ nitrogen hydrogen 1300 l s⁻¹ Min backing pump 12 m³ h displacement*

Recommended backing pump RV12 or E2M18 Recommended fluid Santovac® 5 255 ml Fluid charge (dry) Inlet connection compatible with ISO160 NW25 **Backing connection**

Cooling water connection 10 mm compression fittings

1.35 kW Heater power 115 l h⁻¹ Min cooling-water flow at 20°C

6mm coupling x 1/4 BSP male Pneumatic connections^T

stud

Pneumatic actuating pressure

Minimum 2.4bar / 35psi 6.9bar / 100psi Maximum

Weight

160/700M 26kg 160/300P 27kg

Product Description	Order No.
Diffstak 160/700M, 110-125V, 1-ph, 50/60Hz	B34831976
Diffstak 160/700M, 210-225V, 1-ph, 50/60Hz	B34831977
Diffstak 160/700M, 230-250V, 1-ph, 50/60Hz	B34831978
Diffstak 160/700P, 110-125V, 1-ph, 50/60Hz	B34832976
Diffstak 160/700P, 230-250 V, 1Ø, 50/60 Hz	B34832978
Diffstak 160/700P, 210-225 V, 1Ø, 50/60 Hz	B34832977

[†] For maximum throughput 160/700P only

Unvalved Diffstak 160/700 Vapor Pump

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak 160 (ISO160 inlet) design has been proven over many years with thousands of pumps installed. The unvalved Diffstak's are for systems requiring the highest possible ultimate vacuum or for those which do not need a high vacuum valve.

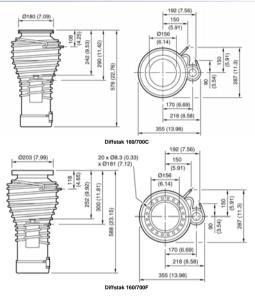
This pump has an unvalved ISO collar inlet flange and is supplied with: NW25 elbow, NW25 centering-ring, NW25 clamp, water pipe couplings and ferrules, inlet ISO 160 Co-Seal.



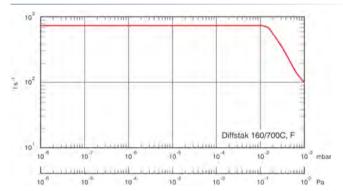
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Dimensions



Performance Curves



Technical Data

Pumping speed	
nitrogen	760 l s ⁻¹
hydrogen	1410 l s ⁻¹
Min backing pump displacement*	12 m ³ h ⁻¹
Recommended backing pump	RV12 or E2M18
Recommended fluid	Santovac® 5
Fluid charge (dry)	250 ml
Inlet connection	
160/700C	ISO160
160/700F	8 inch
Backing connection	NW25
Cooling water connection	10 mm compression fittings
Heater power	1.35 kW
Min cooling-water flow at 20°C	115 l h ⁻¹

18kg

20kg

Weight 160/700C

160/300F

Product Description	Order No.
Diffstak 160/700C, 230-250 V, 1Ø, 50/60 Hz	B34833978
Diffstak 160/700C, 210-225 V, 1Ø, 50/60 Hz	B34833977
Diffstak 160/700C, 110-125 V, 1Ø, 50/60 Hz	B34833976
Diffstak 160/700F, 110-125 V, 1Ø, 50/60 Hz	B34840976
Diffstak 160/700F, 210-225 V, 1Ø, 50/60 Hz	B34840977
Diffstak 160/700F, 230-250 V, 1Ø, 50/60 Hz	B34840978

^{*} For maximum throughput

Standard Diffstak 250/2000 Vapor Pump



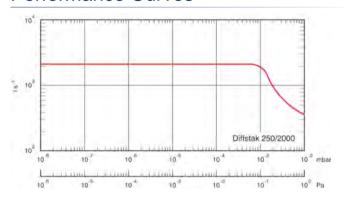
The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak 250 (ISO250 inlet) design has been proven over many years with thousands of pumps installed.

This pump has a manually operated high vacuum isolation valve and is supplied with: NW40 elbow, NW40 centering-ring, NW40 clamp, water pipe couplings and ferrules, inlet ISO 250 trapped 'O' ring.

Dimensions

Performance Curves



Technical Data

Pumping speed	
nitrogen	2000 l s ⁻¹
hydrogen	3000 l s ⁻¹
Min backing pump displacement*	40 m ³ h ⁻¹
Recommended backing pump	E2M40
Recommended fluid	Santovac® 5
Fluid charge (dry)	500 ml
Inlet connection compatible with	ISO250
Backing connection	NW40
Cooling water connection	10 mm compr

10 mm compression fittings Cooling water connection

2.25 kW Heater power Min cooling-water flow at 20°C 180 l h

6mm coupling x 1/4 BSP male Pneumatic connections^T stud

Pneumatic actuating pressure

Minimum 2.4bar / 35psi 6.9bar / 100psi Maximum

Weight

250/2000M 59kg 250/2000P 60kg

* For maximum throughput 250/2000P only

Product Description	Order No.
Diffstak 250/2000M, 110-125 V, 1Ø, 50/60 Hz	B35031976
Diffstak 250/2000M, 210-230 V, 1Ø, 50/60 Hz	B35031977
Diffstak 250/2000M, 230-250 V, 1Ø, 50/60 Hz	B35031978
Diffstak 250/2000P, 110-125 V, 1Ø, 50/60 Hz	B35032976
Diffstak 250/2000P, 210-225 V, 1Ø, 50/60 Hz	B35032977
Diffstak 250/2000P, 230-250 V, 1Ø, 50/60 Hz	B35032978

Unvalved Diffstak 250/2000C Vapor Pump

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Edwards Diffstak 250 (ISO250 inlet) design has been proven over many years with thousands of pumps installed.

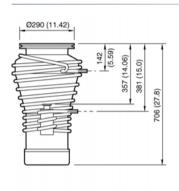
This pump has an unvalved ISO collar inlet flange and is supplied with: NW40 elbow, NW40 centering-ring, NW40 clamp, water pipe couplings and ferrules, inlet ISO 250 trapped 'O' ring.

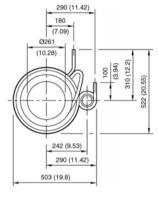


3 Page

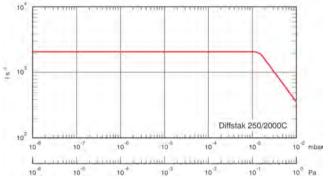
115

Dimensions





Performance Curves



Technical Data

Pumping speed

nitrogen 2130 l s⁻¹
hydrogen 3200 l s⁻¹
Min backing pump displacement* 40 m³ h⁻¹

Recommended backing pump E2M40
Recommended fluid Santovac® 5
Fluid charge (dry) 500 ml
Inlet connection compatible with ISO250
Backing connection NW40

Cooling water connection 10 mm compression fittings

 $\begin{array}{lll} \mbox{Heater power} & 2.25 \mbox{ kW} \\ \mbox{Min cooling-water flow at 20°C} & 180 \mbox{ l h}^{-1} \\ \mbox{Weight} & 46 \mbox{ kg} \end{array}$

Product Description	Order No.
Diffstak 250/2000C, 110-125 V, 1Ø, 50/60 Hz	B35033976
Unvalved Diffstak 250/2000C Vapor Pump, 210-225 V, 1Ø, 50/60 Hz	B35033977
Unvalved Diffstak 250/2000C Vapor Pump, 230-250 V, 1Ø, 50/60 Hz	B35033978

^{*} For maximum throughput

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- M-model pumps have a manually operated high vacuum valve. P-model pumps have a pneumatically operated high vacuum valve. Both M-model and P-model pumps have inlet flanges which are compatible with ISO flanges: the internal diameter of the inlet flange is narrower and the flange is deeper than a standard ISO flange, to accommodate the high vacuum valve.
- C-model pumps do not have a high vacuum valve and have an ISO flange on the inlet.
- F-model pumps do not have a high vacuum valve and have a CF flange on the inlet.

63/150, 100/300, 160/700 Installation

Refer to the diagrams and the tables on these pages to identify the pipeline components and valves required to complete the typical Diffstak installation shown. Items supplied with the pump are shown as a dotted line. Read the footnotes below the diagrams and the tables for more information and for details of the installation requirements for the different models of Diffstaks.

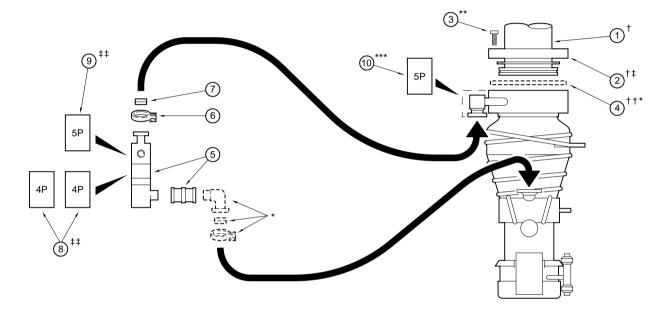


Diagram	gram Component 63/150 C		mponent 100/300 Component			160/700 Component	
Key	Description	Size	Quantity	Size	Quantity	Size	Quantity
1 [†]	ISO tube/collar assembly	ISO63	1	ISO100	1	ISO160	1
2 † ‡	Rotable flange pack	ISO63	1	ISO100	1	ISO160	1
3 **	Bolts (size x minimum length, mm)						
	M- and P-model	M8 × 75	4	M8 × 75	8	M10 × 90	8
	F-model	_	_	M8 × 55	16	M8 × 60	20
4 ††	Inlet seal	ISO63	1	ISO100	1	ISO160	1
5	BRV valve, manual	BRV10M	1	BRV25M	1	BRV25M	1
	BRV valve, pneumatic	BRV10P	1	BRV25P	1	BRV25P	1
6	Clamp	NW10	1	NW25	1	NW25	1
7	O-ring assembly	NW10	1	NW25	1	NW25	1
8 ‡‡	4-port light-weight electropneumatic control valve	_	2	_	2	_	2
9 ‡‡	5-port electropneumatic control valve	_	1	_	1	_	1
10 ***	5-port electropneumatic control valve	-	1	-	1	-	1

- These items are supplied with the pumps, except that the inlet seal for the F-model pumps is not supplied.
- Not required for F-model pumps; use CF fittings (which must be obtained from another supplier)
- Not required for C-model pumps; use claw clamps to bolt the pump ISO inlet flange directly to the ISO tube/collar assembly.
- Bolts are not available from Edwards. Bolts are not required for C-model pumps; use claw clamps to bolt the pump ISO inlet flange directly to the ISO tube/collar assembly; use 4 claw clamps for ISO63, ISO100 and ISO160 flanges.
- These inlet seals are suitable for standard, cryo-cooled and C-model pumps only; use CF fittings (which must be obtained from another supplier) for F-model pumps.
- Required only for pneumatic operation BRV valves; use either 1 5-port control valve or 2 4-port control valves. If you use 2 4-port control valves, you can use the isolation position of the
- *** Required only for P-model pumps, to control the operation of the high vacuum valve.

250/2000 Installation

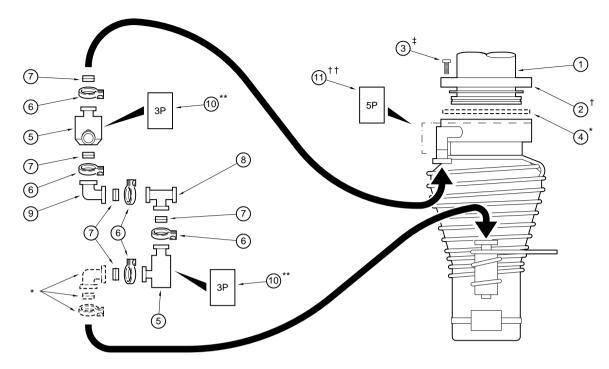


Diagram	Component	Comp	oonent	
Key	Description	Size	Quantity	
1	ISO tube/collar assembly	ISO250	1	•
2 †	Rotatable flange pack	ISO250	1	
3 [‡]	Bolts (size, minimum length, mm) M- & P-model	M10 × 110	12	
4	Inlet seal, trapped O-ring	ISO250	1	
5	PV40 valve, manual	PV40MK	2	
	PV40 valve, pneumatic	PV40PK	2	
6	Clamp	NW40	5	
7	O-ring assembly	NW40	5	
8	T-piece	NW40	1	
9	Elbow	NW40	1	
10 **	3-port electropneumatic control valve		2	
11 ^{††}	5-port electropneumatic control valve	-	1	

EO50/60 Air Cooled Diffusion Pump



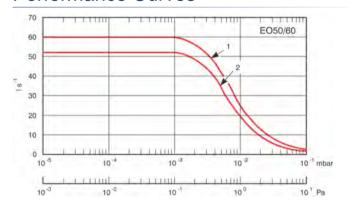
The model EO50/60 is a compact, fast warm-up air-cooled diffusion pump supplied complete with high integrity inlet Co-Seal, flange clamping ring and optional baffle. The jet assembly is removable for easy cleaning. It meets the need for a low-cost, high vacuum pump for use in desk top or mobile scientific instruments, leak detectors, and general laboratory applications.

In many applications the rapid warm-up capability will enable the EO50/60 to be used without an isolation valve. However, the pump is not intended for use on valveless systems where rapid cycling from atmospheric pressure through the hot pump is required. Edwards offers the TV range of diffusion pumps for these applications.

Dimensions

(191) 91 (3.58)

Performance Curves



Technical Data

Pumping	speed
---------	-------

Air

60 l s⁻¹ (27 l s⁻¹ baffled) hydrogen 70 l s⁻¹ (50 l s⁻¹ baffled)

Minimum backing pump displacement *

1 m h -1 E2M1.5

20 ml

Recommended backing pump

Santovac® 5, Silicone

Recommended fluid

DC704EU

Fluid charge (dry) Inlet connection

NW50 flange NW10 flange

Backing connection Heater power

250 W 4.5 m³ h

Minimum cooling air flow Warm up time

Weight

4 min 2 kg

Product Description	Order No.
EO50/60, 230-250V (0.2kW), 50/60Hz, 1-ph	B30207240
EO50/60, 110-125V (0.2kW), 50/60Hz, 1-ph	B30207110
EO50/60, 180V (0.25kW), 50/60Hz, 1-ph	B30207180
EO50/60, 210-225V (0.2kW), 50/60Hz, 1-ph	B30207210
EO50/60, 90V (0.25kW), 50/60Hz, 1-ph	B30207090

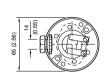
^{*} For maximum throughput

Vapor Pump Accessories

Cooling-Fail Thermal Snap-Switch

This switch opens at a preset temperature to indicate failure of the cooling water flow. The switch resets (closes) when the pump cools down to a preset temperature.

Dimensions





Use with these pumps

Electrical data Preset operation temperatures

Open Close (automatic reset) Diffstak, EO2, EO4, EO6, EO9 18B4A and 30B5A 25 A at 120 V a.c. or 240 V a.c.

46 ± 5 °C 38 ± 5 °C

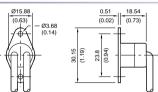
Ordering Information

Product Description	Order No.
Cooling-fail thermal snap-switch	B02302000

Cooling-Fail Thermal Snap-Switch (EO50/60 and SI100)

This switch opens at a preset temperature to indicate failure of the cooling water flow. The switch resets (closes) when the pump cools down to a preset temperature.

Dimensions



Use with these pumps Electrical data

15 A at 120 V a.c. resistive or 10 A at 240 V a.c. resistive Preset operation temperatures 50 ± 3 °C

Close (automatic reset)

35 ± 3 °C

EO50/60, SI100, EO100/90

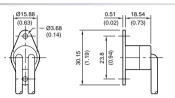
Ordering Information

Product Description	Order No.
Cooling-fail thermal snap-switch	B27903006

Cooling-Fail Thermal Snap-Switch (TVA50/60 and TVW50/60)

This switch opens at a preset temperature to indicate failure of the cooling water flow. The switch resets (closes) when the pump cools down to a preset temperature.

Dimensions



Use with these pumps Electrical data

Preset operation temperatures Close (automatic reset)

TVA50/60, TVW50/60 15 A at 120 V a.c. resistive or 10 A at 240 V a.c. resistive

60 ± 3 °C 50 ± 3 °C

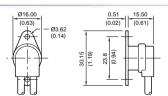
Ordering Information

Product Description	Order No.
Cooling-fail thermal snap-switch	B02304002

Pump-Ready Thermal Snap-Switch

This switch opens at a preset temperature to indicate that the pump is at operating temperature. It can be used to control the opening of a high vacuum valve. The switch resets (closes) when the pump cools down to a preset temperature.

Dimensions



Use with these pumps

Electrical data

All Diffstak, EO50/60, SI100, EO100/90 EO4, EO6, EO9

6 A at 120 V a.c. resistive or 3 A at 240 V a.c. resistive or 7 A at 30 V a.c. or dc, resistive

Preset operation temperatures

80 ± 2.8 °C Close (automatic reset) 60 ± 2.8 °C

Ordering Information

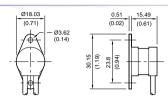
Product Description	Order No.
Pump-ready thermal snap-switch	B02304000

3

Boiler Protection Thermal Snap-Switch

This switch opens at a preset temperature when the pump boiler base exceeds the maximum safe operating temperature. The switch resets (closes) when the pump cools down to a preset temperature.

Dimensions



Use with these pumps Electrical data EO50/60, EO100/90, SI100 15 A at 220 V a.c. 50/60 Hz 10 A at 240 V a.c. 50/60 Hz

Pre-set operation temperatures Open Close (automatic reset)

200 ± 4.4 °C 184 ± 4.4 °C

Ordering Information

Product Description	Order No.
Boiler protection thermal snap-switch	B02304001

Heaters for Obsolete HT Pumps

Product Description	Order No.
HT20 2100 W (six required)	
200 V	H01706030
220 V	H01706031
380 V	H01706032
400 V	H01706033
415 V	H01706034
460 V	H01706035
480 V	H01706036
EO35 2500 W (six required)	
380 V	H01706080
400 V	H01706081
415 V	H01706082
440 V	H01706085
460 V	H01706083
480 V	H01706084

Thermal Probe (HT Pumps)

The thermal probe is used to measure the temperature at the base flange of the pump.

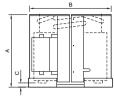
Ordering Information

Product Description	Order No.
HT10 thermal probe	B61101000
HT16B thermal probe	B61221000
HT20B thermal probe	B61421000

Heat Shield (HT Pumps)

The heat shield ensures that there are no easily accessible surfaces which are hotter than 27 °C.

Dimensions



	HT10	HT16	HT20
Α	356	406	450
В	402 Ø	556 Ø	640 Ø
С	17	17	17

Ordering Information

Product Description	Order No.
HT10 heat shield	B61105000
HT16B heat shield	B61225000
HT20B heat shield	B61425000

Inlet Baffle (HT Pumps)

The optically dense inlet baffle reduces backstreaming of the pump fluid to less than 5×10^{-5} mg cm⁻² min⁻¹.

Ordering Information

Product Description	Order No.
HT10 inlet baffle	B61103000
HT16B inlet baffle	B61203000
HT20B inlet baffle	B61403000

Fluid Sight Glass (HT10 Pump)

The fluid sight glass allows you to see the level of fluid in the pump. The correct operating range for the fluid level is shown on the sight glass.

Product Description	Order No.
Fluid sight glass	B61106000

Measurement & Control







4

APG100 Active Pirani Vacuum Gauge	124
APGX-H Active Linear Convection Gauges	126
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WRG Active Wide Range Gauge	139
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CG16K Capsule Dial Gauge	147
IS16K Vacuum Interlock Switch	149
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Vacuum Measurement and Control Systems

The Edwards range of instruments offers:

- Measurement over the range 2000 to 10⁻¹¹ mbar
- · Advanced microprocessor based controllers
- · Calibration of instruments to UK national standards

Selecting Your Vacuum Gauge

Edwards offers a wide choice of vacuum measurement and control products – from dial gauges to microprocessor based gauge controllers. Within each product range, there is a family of models designed to meet the widest user specification.

The first step in selecting the right gauge to meet your application is to decide the range of pressures that you want to measure at each of your measuring points. The chart below indicates the broad pressure ranges covered by the spectrum of Edwards instruments: use this chart as a primary guide to the choice of gauge head.

The second step is to establish your requirement for the output of the pressure measurement. If you simply want an indication that a certain level of vacuum has been reached (for example, to open a valve or start a process), then a vacuum switch or Active gauge head alone may be appropriate. If you want to display the pressure locally, then a dial gauge may be suitable. If you need the pressure display to be remote from the measurement point (for example, in a control panel) then select the TIC Instrument Controller or Active Digital Controller, depending on the features you require. (You will also need to select appropriate gauge head(s) to accompany these displays and controllers.) If your control system (such as a PLC, PC or dedicated microprocessor controller) needs to know the pressure to make sequence decisions but you do not need a separate vacuum display, then you can use an Active gauge head as a stand-alone transducer connected to an appropriate power supply and control system analog input.

Thirdly, you need to select a gauge suitable for the process gases and constructed to withstand exposure to the external environment of your vacuum system. Consider both whether the gauge will survive in the process and also whether the process gases will effect the gauge's measurement. For example, the measurement made by mechanical gauges (vacuum switches, dial gauges, strain gauges and capacitance manometers) is not affected by gas composition, whereas that made by other types of gauges is gas dependent.

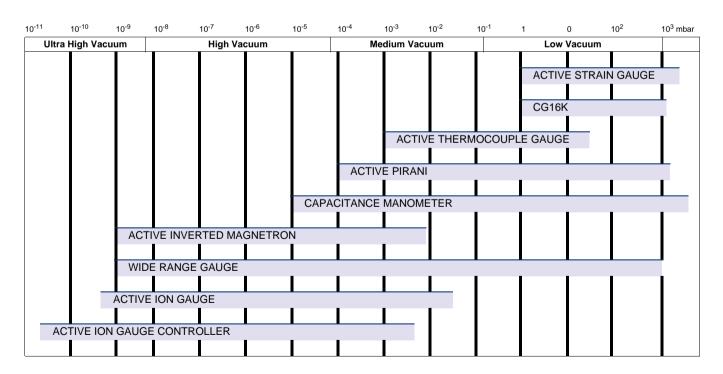
Calibration for Different Gases

All of our gauge heads are calibrated for dry nitrogen; the calibration for dry air is the same. If you use thermal conductivity or ionization gauges with gases other than nitrogen or air, you may need to apply a gas correction factor for an accurate indication of your system pressure. Please contact us if you need more information.

Gauge Head Installation

How you install the gauge head into your vacuum system will affect the accuracy and reliability of your pressure measurement. For best performance we recommend that you:

- Connect the gauge head to your vacuum system with a straight, short branch pipe. This pipe should have an internal diameter no less than that of the gauge tube itself. Long, narrow or angled connections can cause a significant measurement error. Note that the indicated pressure may be higher or lower than the actual pressure.
- Connect the gauge head as close as possible to the point where you want to measure the system pressure.
- Orientate the gauge head so that it is vertical, with the connection to the vacuum system at its base. This prevents debris falling into the gauge.



The Active Gauge Concept



- Operate from standard power supplies for simple installation
- Gauge type identification signal and common 0-10 V d.c. output
- Cable lengths of up to 100 m for remote operation
- · Range of microprocessor based controllers
- The Active gauge range with TIC Instrument Controller give continuous measurement from 2000 mbar to 10⁻¹¹ mbar
- · Low cost analog and digital displays and controllers available

Edwards Active vacuum gauges and controllers give unrivalled performance, flexibility and ease of use. Traditionally, vacuum gauges consisted of a sensing element and a separate display/controller. With Edwards' Active gauges, the functions that are specific to the gauge type (such as signal conditioning and specialized power supplies) have been moved from the dedicated controller and incorporated in the head itself. Now the gauge head can be used as a stand-alone transducer: it requires only a simple power supply and it provides a 2 to 10 V output.

Alternatively, you can connect the gauges to a Edwards display or universal controller: these will accept all gauge types in any combination for the most flexible solution.

The Active Gauge Range

Active Pirani Gauge A range of Pirani gauges including linear measuring from above atmospheric pressure to 10⁻⁴ mbar, with integral set-point for OEM use.

Active Ion Gauge A new range of small self-contained Active ion gauges with a measuring range from 5×10^{-2} to 5×10^{-10} Torr. The gauges incorporate degas, automatic emission current switching, automatic filament protection, a push button adjustable set point and status indicating LED.

Active Inverted Magnetron Operating through the range 10⁻² mbar to 10⁻⁹ mbar, with integral set-point for OEM use. A low external magnetic active field version is available.

Active Wide Range Gauge A range of gauges measuring from atmosphere to 10⁻⁹ mbar with a linear output and integral set-point for OEM use. A low external magnetic field version is available.

Active Thermocouple Gauge A range of gauges measuring from atmosphere to 10⁻³ mbar, with integral set-point for OEM use and LED indication of vacuum status.

Active Strain Gauge A range of strain gauges measuring from 2000 mbar to 1 mbar. This type of gauge is extremely rugged and offers accurate, gas independent measurement.

Ion Gauge Controller The Ion Gauge Controller can operate one or two ion gauge tubes, as well as a high pressure interlocking gauge. It has a measurement range of 5×10^{-3} to 2×10^{-11} mbar, with 3 levels of emission current and electron bombardment type degas.

Barocel Capacitance Manometers

The Barocel manometers provide high accuracy, high stability, gas independent pressure measurement making them ideal for a wide range of industrial process, research and calibration applications. Their Iconel/Monel construction means that they can also be used with corrosive and radioactive gases.

- · Accuracy 0.15% of reading
- · True total pressure measurement, independent of gas species
- · Very high corrosion resistance
- · Fast response
- Wide range, 4 decade range with single head
- Temperature controlled manometers from 45 to 123 °C
- Excellent stability
- Full scale ranges from 1 mbar to 1000 mbar (0.05 Torr to 1000 Torr)

Active Controllers and Displays

The Edwards Active range of gauges can operate as stand-alone pressure transducers requiring only a simple power supply and providing a 2 to 10 V analog output. If you need a complete vacuum measuring and display system, we also offer a range of controllers and displays.

Our displays and controllers are designed for maximum flexibility and ease of use. The range is suitable for bench-top or panel mounting and options include RS232 interfacing.

TIC Instrument Controller A compact instrument controller with a large clear graphical display, an intuitive user interface and serial communications providing full remote control and data logging functions for one or more TIC systems via a new WindowsTM based PC program.

The controller supports, automatically recognizes and controls up to six gauges from the Edwards range (including IGC and up to three Barocels), with coverage from 2000 to 6.6 x 10⁻¹⁰ mbar. Low pressure gauges may be controlled and protected by high pressure gauges and there are open collector set point outputs. An optional relay box uses these outputs to control mains changeover relays.

The TIC instrument controller may be either rack or bench mounted and provides a useful hub for the flexible operation of a wide range of vacuum system configurations.

Active Digital Controller The Edwards Active Digital Controller (ADC) is a compact single gauge controller and display. It features a bright LED display and simple push-button controls. The ADC automatically recognizes compatible Edwards gauges, loads the appropriate lookup table and displays the pressure in commonly used vacuum units.

The ADC is available in standard and enhanced versions. The standard controller displays the pressure measured by a single active gauge. The enhanced controller supports two similar gauges — it has two variable hysteresis set-points which are linked to 48 V d.c. 1 A changeover relays and two 0-10 V d.c. analog outputs. To aid system integration, the enhanced controller is provided with an RS232 interface.

When combined with a suitable gauge, such as the Edwards APGX-H Convection Pirani or Wide Range Gauge (WRG), the ADC represents a cost effective means of monitoring and controlling process vacuum in a broad range of applications.

Other Instruments

In addition to the range of Active gauges, Edwards offers a variety of more traditional vacuum measurement and control products.

Our simple dial gauges provide rugged, local indication of pressures from atmosphere to 1 mbar and are ideal for vacuum chambers in an industrial environment. Vacuum switches, with high current ratings, give a simple method of directly controlling loads without the need for additional relays or power supplies.

Gauge Calibration Service

All Edwards gauges may either be supplied with a calibration certificate or re-calibrated by request.

- Provides certificate of calibration traceable to National Standards which meets ISO9000 requirements worldwide
- · Service available for both new and returned instruments
- · Transducers calibrated separately or with display/controller

As a leading manufacturer of vacuum instruments, Edwards offers an expert calibration and repair service with 25 years of experience. Other manufacturers' vacuum instruments including Helium leaks are also covered. The instruments are calibrated with dry nitrogen; for calibration with other gases or at specific pressures, please consult Edwards. The option of calibration figures before and after adjustments and repairs is also available.

The range of instruments include:

- Active gauges, displays and controllers. Note that Active gauges can be calibrated on their own, with a display or with a controller.
- Capacitance manometers. Note that some types of manometers can be calibrated as stand-alone instruments, with a controller or with a pressure monitor, for example the TIC Instrument Controller.
- Helium quartz leaks for mass spectrometer leak detectors.
 Contact Edwards for details.

APG100 Active Pirani Vacuum Gauge





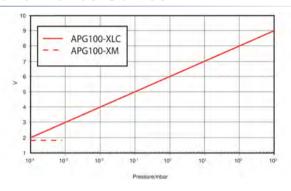
Features include compact size for easy installation, a linear output, and a replaceable sensor tube. The new gauges are compatible with all Edwards TIC instrument controllers and other active gauge controllers and displays. They are also CSA, C/US approved as well as fully RoHS compliant due to their lead-free construction.

4 Features & Benefits

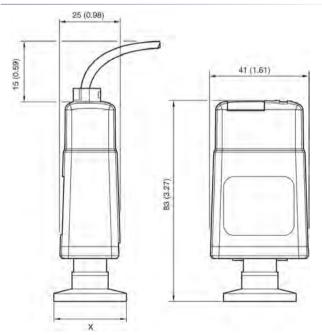
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- Cable connections and gauge adjustment conveniently located, thereby minimizing the space envelope required for access
- Sensor tube can be baked to 150 °C
- · Adjustable set-point for simple process control and interlocking
- Remote calibration possible
- CSA, C/US approved

Performance Curves



Dimensions



Product Description	Order No.
APG100-XM, NW16	D02601000
APG100-XM, NW25	D02602000
APG100-XLC, corrosion resistant, NW16	D02603000
APG100-XLC, corrosion resistant, NW25	D02604000
APG100-XM, NW16, Certified	D0260100C
APG100-XM, NW25, Certified	D0260200C
APG100-XLC, NW16, Certified	D0260300C
APG100-XLC, NW25, Certified	D0260400C

Mass 85 g 5 cm³ Internal volume IP40 Enclosure rating

Measurement range (APG100-

Measurement range (APG100-XLC)

Atmosphere to 10⁻³ mbar Atmosphere to 10⁻⁴ mbar

Accuracy (APG100-XM) Typically +/- 15% at <100 mbar Accuracy (APG100-XLC) Typically +/- 15% at <10 mbar

Maximum over-pressure 10 bar absolute Operating temp range 5º to 60º C -30° to 70° C Storage temp range Bake-out with no electronics

150 °C

80% RH up to 31 $^{\circ}\text{C}$ decreasing linearly to 50% RH at 40 $^{\circ}\text{C}$ and Humidity

3000 m Maximum altitude

Filament temperature 100 °C above ambient Electrical supply voltage 15 to 30 V d.c. nominal 13.5 V d.c. minimum 32 V d.c maximum

Power consumption 1 W

Output signal 0 to 10 V d.c. nominal

Set-point - open collector

transistor

30 V d.c. 100 mA Rating Range of set-point 1.8 to 9.2 V dc 500 mV (1/2 decade) Fixed hysteresis

Level setting resolution 6 mV 4

APGX-H Active Linear Convection Gauge





Edwards Linear Convection Vacuum Gauge has a wide measuring range from 1333 to 3 x 10^{-4} mbar (1000 to 2.3 x 10^{-4} Torr). The use of convection technology ensures accuracy and sensitivity are maintained to the top of the range.

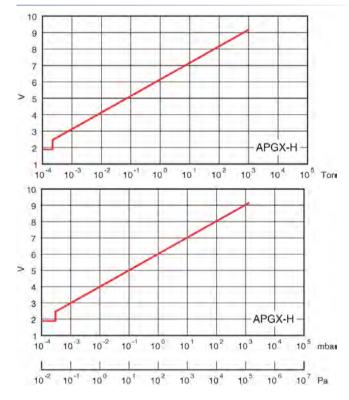
The gauge is compact and may be mounted in any orientation, simplifying installation where space is limited. The gauge incorporates a setpoint and two LEDs, which indicate setpoint and gauge status.

4 Features & Benefits

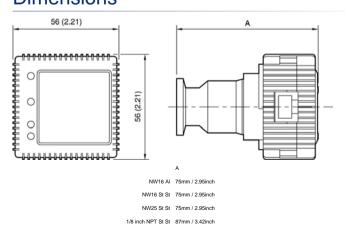
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- Wide Measuring Range 1333 to 3 x 10⁻⁴ mbar (1000 to 2.3 x 10⁻⁴
 Torr)
- Use of convection technology ensures consistent measuring accuracy (typically ±15%) and repeatability (±5%) to top of range
- · Reduced Cost of Ownership
- Replaceable tubes are available
- · CSA, C/US Approved

Performance Curves



Dimensions



Product Description	Order No.
APGX-H-NW16, aluminium	D02391000
APGX-H-NW25 ST/ST	D02392000
APGX-H-NW16 ST/ST	D02395000
APGX-H 1/8" NPT ST/ST	D02396000
APGX-H-NW16 Aluminium, certified	D0239100C
APGX-H-NW16 ST/ST, certified	D0239500C
APGX-H-NW25 ST/ST, certified	D0239200C
APGX-H 1/8" NPT ST/ST, certified	D0239600C

1333 to 3 x 10⁻⁴ mbar(1000 to 2.3 x 10⁻⁴ Torr) Pressure range

14.5 to 30 V DC Power supply Power consumption 1.5 W maximum

±15% of reading ±3 x 10⁻⁴ mbar Accuracy

Repeatability ±5% of reading Resolution 6mV increments < 100 ms Response time

Maximum overpressure 10 bar absolute (145 psia)

> Set vacuum and set atmosphere. To allow for variations in barometric

Adjustments pressure, atmosphere may be set in the range 700 to 1100

mbar (525 to 825 Torr).

Setpoints† (open collector

transistor)

Range of setpoint 1.8 to 9.3 V

Rating 30 V DC 100 mA

Fixed hysteresis (1/2 decade)

500 mV

4

[†] The setpoint output will be turned off if an error is detected. For further information, please contact Edwards.

ATC Active Thermocouple Gauge





The Edwards Active Thermocouple (ATC-E) gauges mount directly on either the ATC-D or ATC-M thermocouple tubes to form a compact, stand-alone transducer.

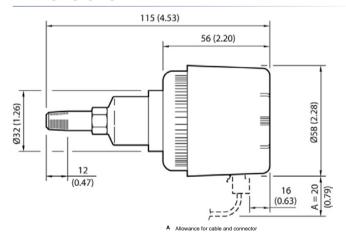
The ATC-E electronics module drives both medium and low pressure gauge tubes. These gauges offer a cost effective measuring solution for higher pressures.

4 Features & Benefits

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- Drive electronics mount directly on the gauge tube which simplifies the system design and saves valuable rack space
- Wide range, regulated, internal power supply runs from standard d.c. power supplies from +13.5 to +36 V and is tolerant to voltage fluctuations
- Standard analog outputs of 0 to +10 V d.c. and gauge identifier allows for easy interface with a computer or PLC and provides fault output indication
- Adjustable set-point with vacuum status LED can be used for process control and interlocking and includes a digital vacuum status signal with set-point level ready visually
- Low output impedance and integral Faraday shield provides a high level of noise immunity and permits long cable runs of up to 100 meters

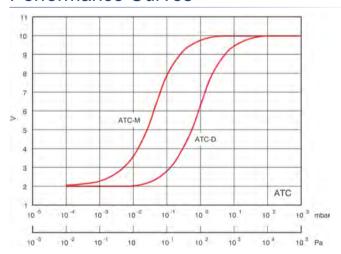
Dimensions

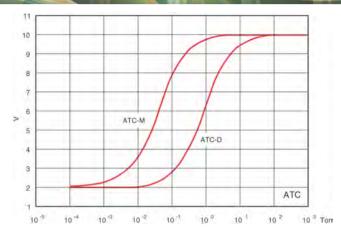


Applications

Active thermocouple gauges are ideally suited to applications where a simple rugged gauge is required to measure higher pressures.

Performance Curves





ATC-E Electronics Module

Power supply +13.5 to +36 V d.c. (max 1 V

ripple)

Power consumption 0.54W maximum

Output signal

Operating 2 to 10 V d.c.

Fault output 0 to 2 V d.c., 10 to 13.5 V d.c.

Output impedance 0.1 ohms
Minimum load 10 k ohms

Tube Type Selection

Adjustments Adjust set point visually via

potentiometer

Set point Open collector transistor
Range of set point 2 to 85 full scale voltage
Fixed hysteresis 12 full scale voltage
Level setting ±2 full scale voltage

Rating 40 V d.c., 100 mA maximum

Temperature range

Operating +5 to +60 °C Storage 0 to +70 °C Weight 110 g

External interface connector 8 way FCC68 / RJ45 socket

ATC-D, ATC-M gauge tubes

Pressure range

ATC-D $50 \text{ to } 5 \text{ x } 10^{-2} \text{ Torr}$

65 to 6.5 x 10⁻² mbar

ATC-M 1 to 1 x 10^{-3} Torr

1.3 to 1.3 x 10⁻³ mbar

Maximum overpressure

ATC-D 10 bar absolute ATC-M 3.4 bar absolute

Weight 55 g

Internal volume

ATC-D 1 cm^3 ATC-M 8 cm^3

For more information, contact Edwards.

Product Description	Order No.
ATC-E Electronics module	D35108000
ATC-D 1/8 inch NPT gauge tube	D35512000
ATC-M 1/8 inch NPT gauge tubes	D35513000

ASG Active Strain Gauge





The Edwards Active Strain Gauge (ASG) is a rugged, corrosion resistant diaphragm gauge which provides accurate, gas independent measurement from 2000 mbar to 1 mbar. It can be used as a stand-alone transducer allowing OEMs and system builders to develop low cost, flexible solutions to their vacuum instrumentation needs. Alternatively, it can be connected to the TIC Instrument Controller where it can be combined with many other sensor types to provide a complete vacuum instrument solution.

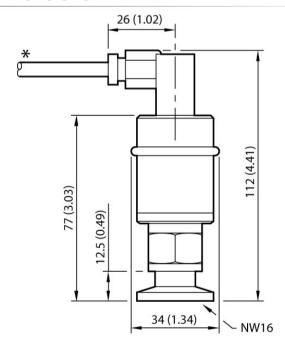
Note: ASG adaptor cable supplied separately. This cable must be used with TIC, AGC, ADC & ADD.

4 Features & Benefits

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- Drive electronics combined in the gauge head which simplifies system design and saves valuable rack space
- Wide range, regulated internal power supply which runs from standard d.c. power supplies of +13.5 to +36 V and is tolerant to voltage fluctuations
- Standard analog output of 0 to 10 V d.c. which is easy to interface with a computer or PLC
- High accuracy and stability. Accuracy of ±0.2 full scale and stability 0.2 full scale
- Corrosion resistant, rugged design where the only material exposed to vacuum is stainless steel 316

Dimensions

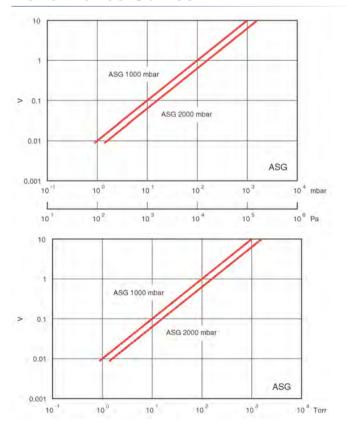


Applications

Active strain gauges are an excellent choice where accurate, gas independent, measurement of pressures around atmosphere are required, making them ideal for applications such as load locks.

It can be used as a stand-alone transducer allowing OEMs and system builders to develop low cost, flexible solutions to their vacuum instrumentation needs. Alternatively, it can be connected to the TIC Instrument Controller where it can be combined with many other sensor types to provide a complete vacuum instrument solution.

Performance Curves



Full scale pressure range 1000 mbar

Accuracy ±0.2 full scale

Stability 0.2 full scale

Temperature coefficient 0.05 full scale per °C

Power supply +13.5 to +36 V d.c.

Power consumption 0.4 W

Output signal

Operating 0 to 10 V d.c. linear

Output impedance <200 ohms

Minimum load 50 k ohms

Response speed 5 msec

Adjustments Set full scale and set zero

Temperature range

Compensated $+10 \text{ to } +50 \text{ }^{\circ}\text{C}$ Operating $-20 \text{ to } +90 \text{ }^{\circ}\text{C}$ Materials exposed to vacuum Stainless steel 316

Internal volume 1.25 cm³
Weight 120g

Electrical connector Miniature 4 pin Din Vacuum fitting 1/8 Inch NPT

Standards

Overall design EN 61010-1

Electromagnetic compatibility EN 61326 (Class B Emissions)

Enclosure rating IP65

	Ordering	Infor	mation
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Product Description	Order No.
ASG 1/8 Inch NPT, 1000 mbar	D35725000
ASG NW16, 1000 mbar	D35726000
ASG NW16, 2000 mbar	D35728000
ASG 1/8 Inch NPT, 2000 mbar	D35727000
ASG 1/8 Inch NPT, 1000 mbar + calibration certificate	D3572500C
ASG NW16, 1000 mbar + calibration certificate	D3572600C
ASG 1/8 Inch NPT, 2000 mbar + calibration certificate	D3572700C
ASG NW16, 2000 mbar + calibration certificate	D3572800C

Model 600 Barocel®



The Model 600 Barocel transducer is an advanced design capacitance manometer which uses advanced technology to improve zero stability after temperature excursions or pressure overloads. An integral vacuum reference of all-welded construction contains gettering material to ensure long-term stability.

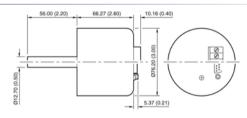
In vacuum systems, the Model 600 Barocel transducer is the ideal replacement for McLeod, Pirani, or thermocouple gauges. Since pressure is sensed by electrically measuring pressure-induced displacement of a thin metal membrane, calibration accuracy is unaffected by the chemical composition of input media.

Features & Benefits 4

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- High accuracy of 0.15 of reading
- High resolution of 0.01 full scale
- Unaffected by overpressure. Repeats within 0.01 full scale after being exposed to 2.4 bar (35 psia)
- True total pressure reading independent of gas composition
- High level output of 0-10 volts d.c. full scale, linear with pressure

Dimensions



Technical Data

 \pm (0.15 of reading + 0.01 of full Accuracy

Resolution Better than ± 0.01 full scale

Operating temperature 0 - 65 °C

Temperature effect on zero <0.005 full scale/°C Temperature effect on sensitivity <0.02 reading/ °C

Overpressure without damage (35 psia), whichever is greatest Repeats within 0.01 full scale

after 2.4 bar (35 psia) absolute exposure

1.25 x full scale range or 2.4 bar

Materials exposes to process Inconel and Monel

8.3 cm³ (includes ½" dia tube) Internal volume

Time constant 8 msec

Output signal 0-10 V d.c. linear with pressure ±15 V d.c ±5 regulated to ±1 at Power requirements

30 mA

Weight 0.7 kg (1.5 lb)

Standards

Overpressure effect

Electronic design EN 61010-1

EN 61326 Industrial location Electromagnetic compatibilty (Class A Emissions)

Ranges to 10000 Torr also available 0.5 of reading also available

Applications

Vacuum applications where greater accuracy is required, without the need to either bake of heat the gauge to eliminate condensation.

Product Description	Order No.
Model 600 Barocel® Absolute Vacuum	Visit our website
Pressure Transducer, 5 mbar, ½ Inch OD Tube	for further info

Model 622 Barocel®

The Model 622 Bakeable Barocel is an adaptation of the field-proven Model 600 vacuum/pressure transducer, the signal conditioning electronic components are separated from the sensor, allowing it to be operated at 200 °C as required by some applications.

The sensor employs the same high performance features found in the Model 600.

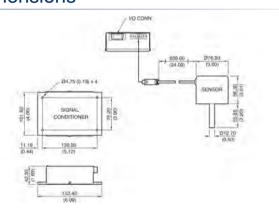
For more information, please contact Edwards or refer to the Documentation tab.



Features & Benefits

- Sensor bakeable and operable to 200 °C
- Fully temperature compensated
- High accuracy of 0.15 of reading
- High resolution which is better than 0.01 full scale
- Stable zero reference

Dimensions



Technical Data

Pressure range 0-10 Torr

Accuracy $\pm (0.15 \text{ of reading} + 0.01 \text{ of full}$

scale)

Resolution Better than \pm 0.01 full scale

Operating temperature

Sensor $0-200\,^{\circ}\text{C}$ Signal conditioner $0-65\,^{\circ}\text{C}$

Temperature effect on zero <0.005 full scale/°C
Temperature effect on sensitivity <0.02 reading/ °C

Overpressure without damage 1.25 x full scale range or 2.4 bar (35 psia), whichever is greatest

Repeats within 0.01 full scale
Overpressure effect after 2.4 bar (35 psia) absolute

exposure

Materials exposes to process Inconel and Monel

Internal volume 8.3 cm³ (includes ½" dia tube)

Time constant 8 msec

Output signal 0-10 V d.c. linear with pressure

Power requirements ±15 V d.c ±5 regulated to ±1 at

wer requirements 30 mA

Weight 1.3 kg (2.9 lb)

Standards

Electronic design EN 61010-1

Electromagnetic compatibilty EN 61326 Industrial location (Class A Emissions)

Ordering Information

Product Description	Order No.
Model 622 Barocel® Bakeable Vacuum Pressure Transducer	Visit our website for further info
Accessories & Spares	Order No.
Barocel 622 To AGC & ADD Cable	D40003030

4

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Ranges to 10000 Torr also available 0.5 of reading also available

Model 655, 658 and 659 Barocel®



The 655 Series of Barocel Vacuum Pressure Transducers employ a number of proprietary design features to enhance reliability and performance. The sensing cell utilizes a unique diaphragm design, stitch welding process, and a new sensing cavity geometry which provides enhanced resistance to particulate contamination. Performance is further improved by isolating the sensor in a patented, temperature controlled, hermetically sealed enclosure which neutralizes the effect of barometric pressure, humidity and ambient temperature changes. The result is a transducer offering long term stability.

Features & Benefits 4

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- Wide measuring range of four decades
- High accuracy of 0.15% of reading
- High resolution of better than 0.005% of FS
- Internal temperature maintained at 45 °C.
- Improved zero stability of less than 0.002% FS / °C

Technical Data

±(0.15% of reading +0.005% of Accuracy full scale)

Repeatability ±0.01% of full scale Resolution ±0.005% of full scale

Warm-up time 2 hours 45 °C Heater temperature 15 - 40 °C Ambient operating temperature Storage temperature -45 to +85 °C

<0.005% of full scale / °C Temperature effect on zero Temperature effect on sensitivity <0.02% of reading / °C Barometric pressure effects <0.005% of full scale / 760 Torr Ambient relative humidity effects <0.005% of full scale in range

0-95% RH

Overpressure limit 3.1 bar abs (45 psia)

<1 x 10⁻¹⁰ std cc / sec at 760 Leak rate to ambient applied

pressure

8.33 cc (including 1/2" OD tube) Internal volume

Materials exposed to pressure Inconel and Monel, 316 SS (for

media vac fittings)

Power required ±15 V d.c. ±5% regulated to 1%

250 mA maximum

Output signal 0 - 10 V d.c. linear with pressure

Output impedance < 0.1 W

Output noise (0-2 KHz) < 0.002% of full scale rms

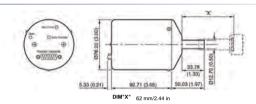
Weight 0.55 kg (1.2 lb)

Standards

Electronic design EN 61010-1

EN 61326 Industrial Location, Electromagnetic compatibility Class A Emissions

Dimensions



Product Description	Order No.
Model 655, 658 and 659 Barocel® Vacuum Pressure Transducer, 100 Pa, NW16	Visit our website for further info
Accessories & Spares	Order No.
Adapter Cable Barocel 600/655 to AGC	D40003050

AIM-X Active Inverted Magnetron Gauge



The Edwards Active Inverted Magnetron Gauges (AIM) combine the gauge-head and controller in one compact Active unit. These gauges have proved to be rugged and reliable in a wide range of applications ranging from scientific instruments to industrial processes.

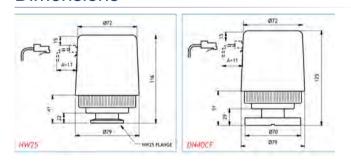
This gauge features a linear output for easy integration with a computer or PLC.



Features & Benefits

- Drive electronics combined in the gauge head which reduces the system cost and saves valuable rack space
- Low output impedance and integral Faraday shield provides high level of noise immunity and permits long cable runs (up to 100 m)
- Low magnetic field version XL for sensitive applications e.g. mass spectrometry and electron microscopy.
- Interchangeable body tube allows for rapid tube replacement without pre-calibration
- · CSA, C/US approved

Dimensions



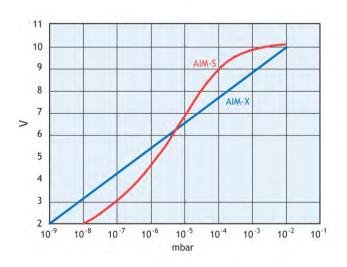
Applications

All vacuum applications requiring rugged and reliable pressure indication in the range 1 x 10^{-2} to 1 x 10^{-9} mbar. Typical processes range from general vacuum through industrial coaters and furnaces to scientific instruments and semicon.

4

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Performance Curves



Pressure Range 10⁻² to 10⁻⁹ mbar AIM-X Typically ±30% Accuracy* Maximum overpressure 10 bar absolute (145 psi) +13.5 to +36 V DC (max 1 V Power supply ripple) Power consumption 2 W Maximum 2 to 10 V DC Output signal Set point Open collector transistor Maximum voltage 40V DC Current 100 mA max Temperature range

Operating +5 to +60°C +0 to +70°C Storage

Materials exposed to vacuum

Stainless steel 304 & 306 & 347, NW25 versions

fluoroelastomer, glass

Internal volume 26 cm³ 0.81 kg Weight

8-way FCC68/RJ45 socket External interface connector

NW25 Vacuum fitting

Standards

Electronic design EN 61010-1

Electromagnetic EN 61326 (Class B Emissions)

compatibility

Flame retardant casing UL94 IP40 Enclosure rating

Ordering Information

Product Description	Order No.
AIM-X-NW25	D14642000
AIM-X-DN40CF	D14662000
AIM-X-NW25, Certified	D1464200C
AIM-X-DN40CF, Certified	D1466200C
AIM-XL-NW25	D14645000
AIM-XL-DN40CF	D14665000
AIM-XL-NW25, Certified	D1464500C
AIM-XL-DN40CF, Certified	D1466500C

4

^{*}Accuracy is reduced at the limits of the measuring range

A compact Active ion gauge with dual yttria coated iridium filaments, a wide measuring range from 6.6×10^{2} to 6.6×10^{10} mbar (5 x 10^{2} to 5 x 10^{10} Torr) and a 1 Volt/decade linear output.

The new AIGX gauge from Edwards incorporates all the benefits of the industry standard Active gauging concept, with integral electronics and replaceable tube. The gauge has a degas facility and includes features to protect and extend the life of the filaments.

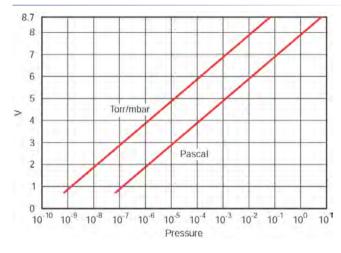
The AIGX benefits from extremely low emissions of charged particles, which makes it an excellent choice for processes where background noise is undesirable.



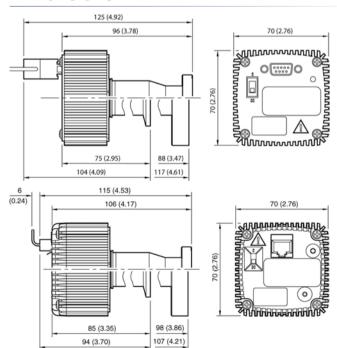
Features & Benefits

- Full 8-decade measurement capability, to 6.6 x 10⁻¹⁰ mbar (5 x 10⁻¹⁰ Torr).
- Two versions available, each with three vacuum coupling variants:
- 'D' versions have a 9-pin 'D' connector and standard interface;
- Up to a thirty-fold reduction in charged particle process contamination compared to leading competitors.
- Automatic filament protection against switching on at atmosphere and running or degassing at high pressure.

Performance Curves



Dimensions



Ordering Information

Product Description	Order No.
AIGX-S-NW25	D04850000
AIGX-S-DN16CF	D04851000
AIGX-S-DN40CF	D04852000
AIGX-D-NW25	D04860000
AIGX-D-DN16CF	D04861000
AIGX-D-DN40CF	D04862000
AIGX-S-NW25 + calibration certificate	D0485000C
AIGX-S-DN16CF + calibration certificate	D0485100C
AIGX-S-DN40CF + calibration certificate	D0485200C
AIGX-D-NW25 + calibration certificate	D0486000C
AIGX-D-DN16CF + calibration certificate	D0486100C
AIGX-D-DN40CF + calibration certificate	D0486200C

4

 6.6×10^{-2} to 6.6×10^{-10} mbar $(5 \times 10^{-2}$ to 5×10^{-10} Torr) Pressure range

+14.5 to +30.0 V d.c. Power supply

Normal operation: 7W (Max), Power consumption

Degas: 14W (Max)

Output signal Linear, 1 Volt / decade

 $1.33 \times 10^{-8} \text{ mbar } (<10^{-8} \text{ Torr})^{-8}$ Response time

1.33 x 10⁻⁸ mbar (<10⁻⁸ Torr) ~1-

2 s

30 V d.c. Maximum voltage Maximum current 100 mA max

Temperature range

0 to +40 °C Operating temperature -30 to +70 °C Storage temperature

For more information, contact Edwards.

4

The Wide Range Gauge (WRG) family offers the capability of single port pressure measurement in the range atmosphere to 10° mbar with a linear output. Its a compact solution, halving the space and connectivity hardware requirement, which can be all important in many applications. The WRG has many novel features, including a new patented striker, pushbutton calibration and set point controls and comprehensive diagnostics. The WRG is a cost-effective vacuum management solution when used either with a Edwards controller or directly integrated into the system controls.



Features & Benefits

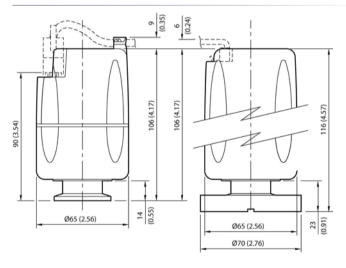
- Microprocessor signal processing gives seamless transition between Pirani and magnetron outputs as well as linear output (log pressure scale)
- D-type version including cable strain relief and enhanced ingress protection - IP44
- Low magnetic field version (SL) available for sensitive applications e.g. mass spectrometry and electron microscopy
- Easily programmed set point covering entire measuring range
- Magnetron uses an advanced patented technique for highly reliable striking, even at high vacuum or in relatively contaminated conditions

Applications

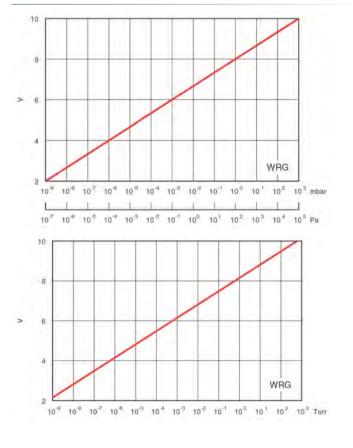
Any vacuum system where there is a need to measure pressure over a wide range. The WRG with an AGD represents a very simple and cost effective means of achieving this.

The linear output and equation make WRG's an attractive option for industrial OEM's where the gauge may be directly integrated into the process controller.

Dimensions



Performance Curves



4

Pressure range	Atmosphere to 10 ⁻⁹ mbar/Torr
Accuracy *	Typically $\pm 15\%$ <100 mbar and $\pm 30\%$ <10 mbar
Maximum over pressure	6 bar absolute (87 psia)
Power supply	+14.5 to +36 V d.c.
Power consumption	2 W maximum
Output signal	1.8 to 10.2 V d.c.
Adjustments	Atmosphere and setpoint
Set point	Open collector transistor
Maximum voltage	40 V d.c.
Current	100 mA maximum

+5 to +60°C

0 to +70 °C

Stainless steel (AISI 304, 316,

321, 347), Fluoroelastomer, soda lime glass, Tungsten, trace of Nickel and Nickel Iron

Class B emissions

Storage

Temperature range

Operating

Materials exposed to vacuum (Both NW and CF versions)

Internal volume 26 cm³ Weight 0.8 kg

External interface connector 8-way FCC68 / RJ45 Socket Use range of active gauge Interface cables cables

Standards

Electronic design EN 61010-1 EN 61326 Industrial Location,

Electromagnectic compatibility

UL94 (V0) Flame retardant casing Enclosure rating IP40

Pin allocation **

1. Power supply positive 5. Signal common 2. Power supply common 6. Set-point output 3. Gauge output 7. Atmosphere calibration

4. Gauge identification 8. Not connected

* Accuracy is reduced at the limits of the measuring range. ** Not shown on diagram

Product Description	Order No.
WRG-S-NW25	D14701000
WRG-S-DN40CF	D14703000
WRG-S-NW25, Certified	D1470100C
WRG-S-DN40CF, Certified	D1470300C
WRG-D-NW25	D14702000
WRG-SL-NW25	D14711000
WRG-SL-NW25, Certified	D1471100C

IGC Ion Gauge Controller

The Edwards Ion Gauge Controller (IGC) provides all the power, control and signal conditioning required to run one or two ion gauge heads. When connected to a Edwards TIC Instrument Controller the user has full control of the ion gauge functions from the TIC front panel. This includes features such as automatic emission current selection and interlock with other gauge types.

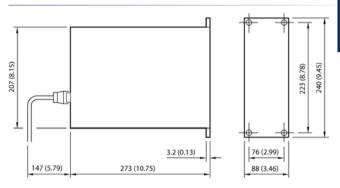
Alternatively the IGC PCSP (Parallel Comand and Station Port) version can be linked directly to a control system such as a PLC to give the OEM or system builder direct access to control inputs and signal outputs.



Features & Benefits

- Wide measurement range with electron beam degas versions offering 5 x 10⁻³ to 2 x 10⁻¹¹ mbar
- Selection of heads available with the choice of electron beam degas, nude or glass encapsulated, tungsten or thoriated iridium filaments
- Flexible cabling system with lon gauge cables which are available in 2 and 3 m lengths including bakeable versions.
 Active gauge cables to link IGC and TIC Instrument Controller are available in lengths up to 100 m.
- Vacuum interlock through an auxiliary high pressure gauge to protect the ion gauge from accidental operation at high pressure.
 It can be interlocked through an Active Pirani or thermocouple gauge connected to the IGC or TIC Instrument Controller.
- Ratiomatic measurement system giving improved measurement accuracy and allowing soft start on filament power-up which gives an added degree of filament protection

Dimensions



Technical Data

Power supply

Input voltage range 90 to 265 V a.c.
Input frequency range 45 to 70 Hz
Mains supply socket IEC 320

Temperature range

Operating 10 to 50 °C
Storage -20 to +70 °C
Relative humidity (non 10 to 90

condensing)

Standards

Electronic design EN 61010-1

Electromagnetic compatibility EN 61326 (Class B Emissions)

Enclosure rating IP20

Pressure range

Electron beam degas (EBEAM) 5 x 10-3 to 2 x 10-11 mbar

Output signal

Electron beam degas (EBEAM) 1 to 10 V d.c. logarithmic
Emission current 0.1, 1.0 or 10 mA (selectable)

Filament power supply

Voltage 8 V d.c. max
Current 5 A max
Power 40 W max

Degas power

Ordering Information

Product Description	Order No.
IGC EBEAM, 2 Head, PCSP	D04846000
IGC EBEAM, 2 Head	D04847000

4

Electron beam (EBEAM)

60 W max (adjustable)

PCSP interface

Active low (less than 3 V) with internal pull up resistors (150 k W) to 28 V

Connections

PCSP interface socket TIC interface socket plus

15 way female D-type 8 way FCC68 / RJ45 socket

Auxiliary gauge socket

8 way FCC68 / RJ45 socket

lon gauge socket

7 way circular multipole

Dimensions

Without rack mounting kit 203 x 87 x 273 mm

With rack mounting kit

Half 19" rack, 2U

Weight

1.8 kg

Note: 2 head versions of the IGC will only drive one head at a time

4

The TIC Instrument Controller provides compact control with a large, clear graphical display, an intuitive user interface and serial communications. The supplied WindowsTMbased PC program provides full remote setup, control and data logging functions via the RS232 interface.

Three TIC Instrument Controllers are available; the three head and six head versions can accomodate 3 or 6 active gauges including the Active Ion Gauge Controller (ebeam version). The six head capman version can accept upto three Edwards Barocel Capacitance Manometers..



Features & Benefits

- Capacitance Manometer Protection
- Six User Configurable Relay Set-points
- Display of Relay Status
- One 0-10 V Buffered Analog Output for each gauge channel
- Windows™ based PC Program

Technical Data

Electrical Data

CEE/IEC 320 Connector type

Electrical supply 90 to 264 V AC, 47 to 63 Hz 3 head TIC 55 VA. 6 Head TIC Power consumption

160 VA

The unit is self-protecting and has no user replaceable fuse. Fuse The unit will recover once any

overload is removed.

underneath TIC)

40 °C

20

3000 m max

0 °C to 40 °C (measured

Max 90% RH non-condensing at

Earth stud

Operating And Storage Data

Ambient operating temperature

Maximum ambient operating

humidity Maximum operating altitude

IP rating

IEC rated pollution degree

Mechanical Data

Weight 1.7 Kg

Interfaces

Serial Interface

Set-points

0-10 V DC - one for each gauge Analogue output

> The TIC has two built-in communications protocols, RS232 and RS485. These may be used either to interface to a PLC or, using the WindowsTM PC software package supplied,

connected to a PC for full monitoring and control of a TIC

system.

6 set-point (open collector) rated at 24V DC 50 mA can be assigned to any gauge. Use

directly or in conjunction with

TIC relay boxes.

Capacitance manometer compatability - 6 head capman versions

3 x 600 or 622 series Barocel

2 x 655 series Barocel

1 x 658 series Barocel

For more information, contact Edwards.

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The Edwards Active Digital Controller (ADC) is a compact single gauge controller and display. It features a bright LED display and simple push-button controls. The ADC automatically recognizes compatible Edwards gauges, loads the appropriate look-up table and displays the pressure in commonly used vacuum units.

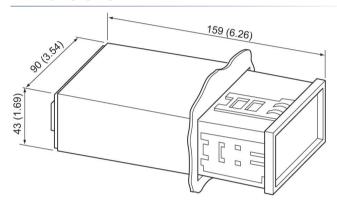
Two versions are available; the standard ADC simply displays the pressure in choice of units, and the enhanced ADC includes a second gauge connection, two set-point relays, two analogue outputs and an RS232 interface.



Features & Benefits

- Plug and measure operation means you simply plug in the mains supply, connect the gauge and ADC displays the measured pressure
- The ADC supports Edwards gauges with a total measuring range of 2000 to 1 x 10⁻⁹ mbar (1500 to 7.5 x 10⁻¹⁰ Torr)
- Bright LED display gives clear, long distance readability
- The ADC displays units in mbar, Torr, Pascal or Volts
- Small 1/8 DIN enclosure, may be panel or bench mounted

Dimensions



Technical Data

Active gauge compatibility

Standard

Panel cut-out

APG100, APG-L, APG-MP, APG-M, APGX-L,

WRG

Up to two identical gauges from Enhanced the standard version plus AIM-

X, AIM-S & ASG

Display High brightness green LED display (0.47 inch high)

Units - mbar/Torr/Pa/Volts

Electrical supply 100 to 240V AC 47 to 63 Hz

92^{+0.8} x 45^{+0.6 mm} (3.62inch x

1.77 inch) to DIN43700 Panel thickness 1.5mm (0.06 inch) Min

Weight 0.33Kg
Operating temperature +0 to +40°C

Operating temperature +0 to +40°C Storage temperature -30 to +70°C

Max ambient operating humidity 90% RH non condensing at

40°C

Electrical safety BS EN 61010-1 2001

Electrical noise immunity

BS EN 61326 (Industrial location, class B emissions)

Flame retardant case materials UL94 V1 Enclosure rating IP40

Enhanced features

Two analogue output 0-10V d.c.

Two set-point relays, volt free single pole change-over

1A at 48V d.c. / 2A at 24V d.c.

Serial output RS232

Ordering Information

Product Description	Order No.
ADC Standard	D39590000
ADC Enhanced	D39591000
ADC Standard + Calibration certificate	D3959000C
ADC Enhanced + Calibration certificate	D3959100C

4

Model 1575 Pressure Display



The Model 1575 Pressure Display is a low cost, microprocessor based, digital display and set-point controller for the Barocel 600, 622 and 655 capacitance manometers. The Model 1575 incorporates power supply, digital display, four user-selectable set-points, along with analog outputs in a compact 1/8 DIN package.

4

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Features & Benefits

- Push button or remote zero adjustment
- Push button full scale calibration
- There are four user programmable solid-state, open collector set-points; two high and two low. The hysteresis band associated with each set-point can also be adjusted to meet system requirements.
- Easy to read LED display
- Optional RS232 output

Technical Data

Signal input \pm 10 V d.c.

d.c. output Transducer input signal

A/D resolution ± 25000 counts

Accuracy1 $\pm 0.005\%$ of reading ± 2 counts

Full scale temperature

coefficient

Zero temperature coefficient .001 ppm/ °C

Zero suppression ± 100% of full scale

Transducer supply ±15 V d.c. at 250 mA

(maximum)

20 ppm/°C

Electrical supply (50 - 60 Hz)

Standard 230 V ac \pm 10% Optional 115 V ac \pm 10%

Set-points (4 open collector

transistors)

Voltage (maximum) 50 V
Current (maximum) 100 mA
Hysteresis (both set-points) 0 - 99 counts

Control status LEDs indicate controls actuated

Temperature range

Operation $+0 \text{ to } +55 \,^{\circ}\text{C}$ Storage $-40 \text{ to } +85 \,^{\circ}\text{C}$ Warm-up time (at 25 $^{\circ}\text{C}$) 30 minutes

Standards

Electronic design EN 61010-1

Electromagnetic EN 61326 Industrial Location,

compatibility Class A Emissions

List of compatible transducers

Barocels 600, 622, 655

Product Description	Order No.
Model 1575, Analog Output, 115V	W60810000
Model 1575, Analog Output, 230V	W60820000
Model 1575, RS232 Output, 230V	W60820004
Model 1575, RS232 Output, 115V	W60810004

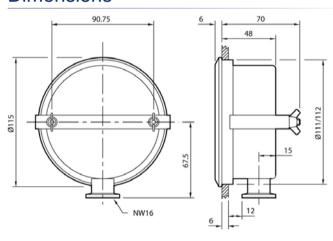
Edwards CG16K capsule dial gauges are barometrically compensated with NW flange fittings. Designed to cover the range of 0 to 1040 mbar, these robust gauges provide accurate, repeatable performance even at low pressures making them equally suited for non-corrosive process plant or for laboratory applications. Fitting is simple: the gauges can be mounted direct or panel mounted using the kit supplied.



Features & Benefits

- Reading independent of gas type
- Accurate to ±2 of full scale
- · Barometrically independent
- Pipeline or panel mounting
- Easy to read linear scale

Dimensions



Applications

- Backfilling
- Portable equipment
- Degassing
- Refrigeration
- Flammable vapors

Ordering Information

Product Description	Order No.
CG16K, 0-1040 mbar	D35610000
CG16K, 0-125 mbar	D35611000
CG16K, 0-50 mbar	D35612000
CG16K, 0-25 mbar	D35613000
CG16K, 0-760 Torr	D35630000
CG16K, 0-100 Torr	D35631000
CG16K, 0-40 Torr	D35632000
CG16K, 0-20 Torr	D35633000
CG16K, 0-1040 mbar + calibration certificate	D3561000C
CG16K, 0-125 mbar + calibration certificate	D3561100C
CG16K, 0-50 mbar + calibration certificate	D3561200C
CG16K, 0-25 mbar + calibration certificate	D3561300C
CG16K, 0-760 Torr + calibration certificate	D3563000C
CG16K, 0-100 Torr + calibration certificate	D3563100C
CG16K, 0-40 Torr + calibration certificate	D3563200C
CG16K, 0-20 Torr + calibration certificate	D3563300C

4

Range 0-1040 mbar, 0-760 Torr

> 0-125 mbar, 0.100 Torr 0-50 mbar, 0-40 Torr 0-25 mbar, 0-20 Torr ±2 of full scale deflection

Maximum applied pressure

Accuracy

25 mbar version 1 bar absolute, 0 bar gauge Other versions 2 bar absolute, 1 bar gauge

Weight 1 kg

Vacuum connection NW16 Flange

Clamp and studs for panel Accessories supplied

4

IS16K Vacuum Interlock Switch



4

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The IS16K vacuum interlock switch is designed to safeguard the operator by ensuring that electrical circuits in the vacuum chamber do not remain energized when the system is let up to atmosphere.

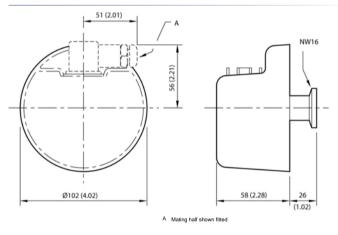
Typical applications include interlocking of the HT cleaning or process circuits on thin film deposition and vacuum systems.

The IS16K is high vacuum compatible and corrosion resistant, with all wetted parts made from stainless steel. A high current rating allows direct switching of loads without additional relays or external power supplies.

Features & Benefits

- Single non-adjustable set-point, cannot be tampered with
- Positive break switch
- Rapid contact separation, prevents arcing
- Breaks circuit directly, no relays required
- Corrosion resistant materials exposed to vacuum

Dimensions



Applications

- **Furnaces**
- TV tube manufacture
- Laboratories
- Tank units
- Packaging

Ordering Information

Product Description	Order No.
IS16K Vacuum Interlock Switch	D05914000

Technical Data

Fixed set-point

640 ±120 mbar* Maximum switching differential 100 mbar

Maximum working pressure

1 bar gauge (2 bar absolute)

10 A resistive, 5 A inductive at

Electrical rating

Type 283 mPm

250 V a.c.

Electrical connection plug Internal volume

7 cm³

Materials in vacuum

Stainless steel

Leak rate

<1 x 10⁻⁹ mbar l s

Enclosure classification

IP52

Weight

0.7 kg

Vacuum connection

Accessories supplied

Mating electrical socket type

^{*} Set point varies with barometric pressure

VS16K Adjustable Vacuum Switch





The VS16K is a general purpose vacuum switch with a user adjustable set-point and small switching differential. This diaphragm operated vacuum switch is high vacuum compatible and corrosion resistant with all wetted parts made from stainless steel. A high current rating allows direct switching of loads without additional relays or external power supplies.

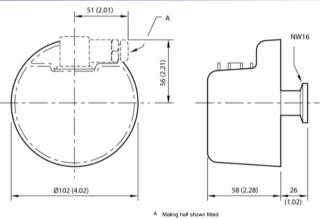
This switch should not be used for safety critical applications. For many interlock applications the Edwards IS16K may be more suitable.

4 Features & Benefits

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- Set-point range 30-1000 mbar
- User adjustable
- Reproducible
- Changeover contacts for normally open or normally closed operation
- Switch point independent of gas composition

Dimensions



Technical Data

Range of adjustment 30 to 1000 mbar

Maximum switching differential 30 mbar

Maximum working pressure 1 bar gauge (2 bar absolute)

Electrical rating 10 A resistive, 5 A inductive at 250 V o 2

250 V a.c.

Electrical connection plug

Type 283 mPm

Internal volume 7 cm³

Materials in vacuum Stainless steel
Leak rate <1 x 10⁻⁹ mbar I s⁻¹

Enclosure classification IP52
Weight 0.7 kg
Vacuum connection NW16

Accessories supplied Mating electrical socket type

183 mPm

Set-point varies with barometric pressure

Applications

- Furnaces
- TV tube manufacture
- Laboratories
- Tank units
- Packaging

Product Description	Order No.
VS16K Adjustable Vacuum Switch	D05915000

Profibus Communications Module

Manufacturers, laboratories and research establishments are converting to fieldbus to take advantage of the reduced cabling and network equipment costs.

Edwards offers a compact, Din rail mountable module to allow Profibus protocol communications with the TIC Turbo and Instrument Controllers, or directly with Edwards DX turbo pumps.

The TIC is a versatile, advanced system controller capable of controlling a series of vacuum pumps and up to three Edwards Active vacuum gauges. The addition of the Profibus module allows full advantage to be taken of digital multi-drop communications.

Features & Benefits

- Full Profibus International Accreditation
- Din Rail Or Rack Mounting
- Wide Operating Voltage Range 9 52 V
- Simple Set-up
- Field Software Upgrades Available

Dimensions



Technical Data

9 - 52 V DC 5W (switch on Electrical supply

surge 500 mA)

0 to 40 ° C Ambient operating temp -30 to 70° C Ambient storage temp

Max ambient operating humidity 90% RH non-condensing

Max operating altitude 2000 m

IP rating IP30 - indoor use only

Mass 0.28 kg

DC power connector (supplied)

Repeater control signal

2-way receptacle. Mating part is cable mount terminal block (supplied). Suitable parts include: Phoenix MSTBV 2.5/2-G-5.08:Weidmuller BLZ 5.08/2:

Amp796634-2: IMO 21.950/2 9-way sub-miniature "D" type

Connector type socket

Electrically compliant with

Profibus data signals RS485 specification isolated

from chassis

10 mA supply (protected for Profibus power supply external terminator resistors if

required)

Digital signal, nominally 0-5 V

but with series 340 ohm resistor. High = module transmitting. Low

= receiving or idle

9-way sub-miniature "D" type RS232 connector TIC version

9600 baud, 1 stop bit, 8 data RS232 protocol

bits, no parity

Screened. Comply with Profibus cable

EN50170

RS232 cable TIC version 15m max. Screening not reg.

> Connection must be either direct to the DX pump flying lead or a

DX pump connection Edwards DX pump extension

cable.

Ordering Information

Product Description	Order No.
TIC Profibus Communications Module	D39750000
DX Pump Profibus Communications Module	D39751000

4

GasCheck G3



Introduced as an enhanced replacement for the popular GasCheck B4, the GasCheck 3000 incorporates a new backlit dot matrix LCD for improved viewing in poor lighting and leak rate indication by both flashing LED and sounder, for easier use in all environments. In addition the GasCheck 3000 has a new tactile keyboard with fewer keys and improved temperature stability for better performance in uncontrolled areas.

4 Features & Benefits

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- Detect leaks with automatic and direct display of gas leak rate
- New, simple to interpret graphical icon display menu
- Choice of readings in cc/sec, mg/m³ or ppm
- Rapidly detects almost any known gas mixture particularly sensitive to ammonia, argon, butane, helium
- Data-logging facility 10 data points with date and time stamp

Technical Data

Detector	Micro thermal conductivity sensor
Min detectable limits of some common gases:	
R134A	5.8x10 ⁻⁵ cc/sec
Helium	1.0x10 ⁻⁵ cc/sec
Argon	3.5x10 ⁻⁵ cc/sec
Carbon Dioxide	4.0x10 ⁻⁵ cc/sec
Sulphur Hexafluoride	2.2x10 ⁻⁵ cc/sec
Response/Recovery time	
Short probe	~1s
Long probe	~9s
Data logging	10 data points with date and time stamp
Batteries	4 off AA Alkaline or NiMH
Operating temp range	0 to 50 °C
Storage temp range	-25 to 70 °C
Length with 110 mm, short probe	390 mm
Length with 300 mm, long probe	580 mm
Storage Case	420 x 320 x 97 mm
Unpacked weight	0.5 kg
Packed weight	1.6 kg
Electrical noise immunity	EN61326, class B emissions

Applications

- Quality assurance testing on manufactured component seals
- Laboratory applications, such as the detection of leaks from gas chromatographs, from mass spectrometers, from gas cylinders and fittings
- Industrial applications, such as the detection of leaks from gas installations, in cylinder receiving rooms, from pipeline assemblies, the detection of leaks from stored gases and the detection of vapours released from stored chemicals
- Medical applications, such as the detection of leaks from gas bottles and pipelines and leak testing of membrane materials, glove boxes and so forth
- Pneumatic applications, such as leak testing of pipeline joints, gaskets and so forth

Product Description	Order No.
GasCheck G3 Leak Detectors	D14132000
Accessories & Spares	Order No.
Short Probe For B Series For Gas Check	D14128801
B Series Long Probe	D14128802
Gas Check Battery Holder	D14130802
Gas Check Nozzle	D14130800

Vacuum Valves







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Complete Range

Whatever the application, Edwards has the right solution to meet your process requirements. Well known for its innovation in pump design, Edwards applies the same energy and commitment to its valves. The result is an extensive range of valves, with a choice of actuation methods, materials and size. Materials of construction have been uncompromisingly selected for performance in high vacuum.

Confidence in Edwards valves begins early in the design process. We use techniques such as Finite Element Analysis to optimize the design of the valve. An arduous testing program in our environmental testing laboratory prior to release to production ensures that every valve we supply will meet the needs of your application. Once in production, all valves are subject to stringent quality control and are individually tested with a helium mass spectrometer leak detector.

Bellows sealed pipeline valves are manufactured with 100% grease free O-rings exposed to vacuum delivering unrivalled low contamination levels.

Selection Guide

When you design a vacuum system, your choice of valves will be determined by the need for certain operating parameters. When you choose a valve for your vacuum system, consider all of the parameters listed in the left hand column of the table as described below.

Actuation The choice is manual, solenoid or pneumatic, which will be determined by your system design and what facilities are available to the machine.

Dirty System Tolerance Vacuum valves have a differing ability to remain leak tight in "dirty" vacuum systems. If your system generates or contains dust or other particulates, choose a valve with a high tolerance.

Size Choose a valve which complements the size of your vacuum pipeline. To maintain high pumping speeds and throughputs, do not reduce the size of your pipeline to accommodate a smaller valve.

Pressure Range Both the maximum and minimum pressure rating are important, particularly if the vacuum system is occasionally pressurized to above atmospheric pressure.

Port Configuration Depending on the location of the valve, you may need either an in-line or a right angle valve.

Life The mean time to failure is important for solenoid and pneumatic valves in rapid cycle duties, or where you have extended maintenance intervals.

Position Indication You may need local or remote indication of valve position as part of your control system.

Closure Speed Use either a solenoid valve or pneumatic valve if you must have rapid valve closure.

Corrosion Resistance Valves are available in stainless steel for those applications that process corrosive gases.

Speedivalve

Edwards SP Speedivalves are diaphragm sealed in-line, isolation valves. The construction consists essentially of a flexible elastomer diaphragm which is sealed onto a lightly polished seat by a screw thread mechanism. The mechanism is isolated from the system by the diaphragm resulting in an extremely rugged and 'dirty' system tolerant valve.

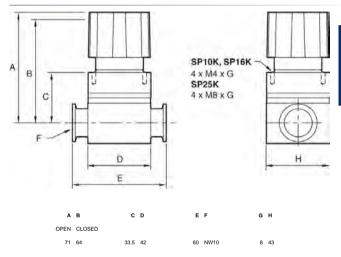
The valve terminates in NW flanges and can be pipeline supported or panel mounted.



Features & Benefits

- Easy to operate with visual indication of valve open (SP10K to SP25K)
- Leak tight to better than 10⁻⁶ mbar I s⁻¹ / 8 x 10⁻⁷ Torr I s⁻¹
- Diaphragm completely isolates mechanism from vacuum system
- Extremely rugged and 'dirty' system tolerant
- Will withstand 9 bar overpressure (SP10K to SP40K, with Co-Seal)

Dimensions



Technical Data

Construction materials	
Body	Aluminum alloy to BS1490
Handwheel and bonnet	Glass reinforced plastics
Diaphragms	Nitrile or Fluoroelastomer
Leak rate (1 bar / 14.5 psi differential)	
Valve (overall and across seat)	10^{-6} mbar Is ⁻¹ /8 x 10^{-7} Torr Is ⁻¹
Coupling	10^{-7} mbar Is ⁻¹ /8 x 10^{-8} Torr Is ⁻¹
Molecular conductance	
SP10K, SP16K	1.7 ls ⁻¹
SP25K	9.0 ls
SP40K	23.3 ls -1
Pressure rating using Co-Seal	9 bar / 131 psi
Ambient operating range	0 to 40 °C
Ambient storage range	-10 to 40 °C
Panel thickness	3 mm / 0.117 in maximum
Weight	
SP10K	230 g / 8.1 oz
SP16K	240 g / 8.4 oz
SP25K	760 g / 26.6 oz
SP40K	2300 g / 80.5 oz
Baking temperature	60 °C

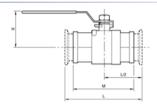
Product Description	Order No.
SP10K, Nitrile Diaphragm, NW Flanges	C33105000
SP10K, Fluoroelastomer Diaphragm, NW Flanges	C33155000
SP16K, Nitrile Diaphragm, NW Flanges	C33205000
SP16K, Fluoroelastomer Diaphram, NW Flanges	C33255000
SP25K, Nitrile Diaphram, NW Flanges	C33305000
SP25K, Fluoroelastomer Diaphram, NW Flanges	C33355000
SP40K, Nitrile Diaphragm, NW Flanges	C33405000
SP40K, Fluoroelastomer Diaphragm, NW Flanges	C33455000

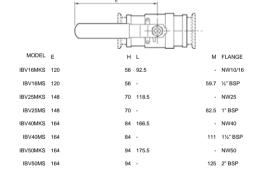
Ball valves are popular in applications where fast action and full bore pumping are needed. The Edwards IBV series valves combine these practical everyday features plus ease of use and economy in a high specification design. Manufactured in 316L stainless steel with PTFE seats they deliver robust performance in a wide variety of vacuum duties.

Features & Benefits

- Low capital cost
- Convenient NW16, 25, 40, 50 sizes
- Optional BSP threaded versions
- Easy to use manual operation
- · High conductance full bore pumping

Dimensions





Technical Data

IBV16MKS (MS)

IBV25MKS (MS)

IBV40MKS (MS)

IBV50MKS (MS)

AISI 316L stainless steel
AISI 316L stainless steel
PTFE
1×10^{-6} mbar $1 \text{ s}^{-1} / 8 \times 10^{-7}$ Torr 1 s^{-1}
5.3 l s ⁻¹
15.9 l s ⁻¹
46.5 s ⁻¹
86.0 I s ⁻¹
7 bar / 102 psi
5 to 65 °C
30000 cycles

1200 / 2.6 (750 / 1.7)

1750 / 3.9 (1500 / 3.3)

3100 / 6.8 (2600 / 5.7)

4300 / 9.4 (3600 / 7.9)

Ordering Information

Product Description	Order No.
IBV16MKS Ball Valve NW16	C36000100
IBV16MS Ball Valve 1/2" BSP	C36000110
IBV25MKS Ball Valve NW25	C36000200
IBV25MS Ball Valve 1" BSP	C36000210
IBV40MKS Ball Valve NW40	C36000300
IBV40MS Ball Valve 1.1/2" BSP	C36000310
IBV50MKS Ball Valve NW50	C36000400
IBV50MS Ball Valve 2" BSP	C36000410

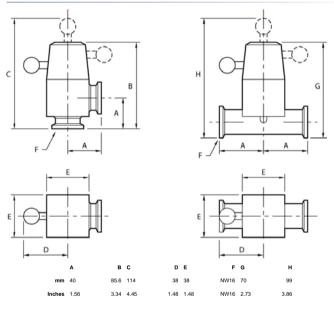
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PVMK Manual Operation Isolation Valve

The PVMKA (aluminum body) is a quick acting, right-angled lever operated valve. The lever, connected to a self-lubricating plastic cam-piston, actuates the valve stem and valve plate through PTFE bearings. The valve plate 'O' ring groove is vented to prevent gas bursts. The valves are designed to operate down to 10⁻⁹ mbar / 8 x 10⁻¹⁰ Torr and up to a pressure of 2100 mbar / 1575 Torr (30 psi).



Dimensions



Ordering Information

Product Description	Order No.
PV16MKA Right Angle, Aluminum, NW16 Connections	C31205000
PV16MKS Right Angle, Stainless Steel, NW16 Connections	C31215000
PV25MKA Right Angle, Aluminum, NW25 Connections	C31305000
PV25MKS Right Angle, Stainless Steel, NW25 Connections	C31315000
PV40MKA Right Angle, Aluminum, NW40 Connections	C31405000
PV40MKS Right Angle, Stainless Steel, NW40 Connections	C31415000
PV50MKS Right Angle, Stainless Steel, NW50 Connections	C31515000

Technical Data

Construction material

Body HE30TF grade aluminum
Bellows AISI 316L stainless steel

'O' ring Fluoroelastomer

Leak rate $< 10^{-9} \text{ mbar I s}^{-1} / < 7.5 \times 10^{-10}$

Torr I s

Operating pressure range 10^{-9} - 2100 mbar / 8 x 10^{-10} -

1575 Torr (30 psi)

Reliability (MTTF) 100000 operations Weight 180 g / 6.3 oz

IPVMK Manual Operation Isolation Valves

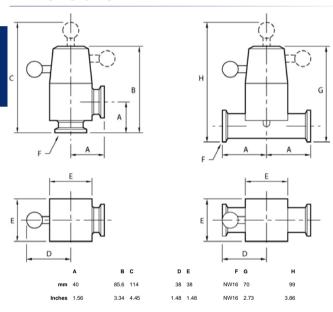


The IPVMKA (aluminum body) is a quick acting, in-line lever operated valve. The lever, connected to a self-lubricating plastic cam-piston, actuates the valve stem and valve plate through PTFE bearings. The valve plate 'O' ring groove is vented to prevent gas bursts. The valves are designed to operate down to 10⁻⁹ mbar / 8 x 10⁻¹⁰ Torr and up to a pressure of 2100 mbar / 1575 Torr (30 psi).

Dimensions

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Ordering Information

Product Description	Order No.
IPV16MKA, Aluminum, NW16	C41218000
IPV16MKS, Stainless Steel, NW16	C41219000
IPV25MKA, Aluminum, NW25	C41321000
IPV25MKS, Stainless Steel, NW25	C41322000
IPV40MKS, Stainless Steel, NW40	C41421000
IPV40MKA, Aluminum, NW40	C41420000

Technical Data

Construction material

Body HE30TF grade aluminum
Bellows AISI 316L stainless steel

'O' ring Fluoroelastomer

Leak rate $< 10^{-9} \text{ mbar I s}^{-1} / < 7.5 \times 10^{-10}$

Torr Is

Operating pressure range 10⁻⁹ - 2100 mbar / 8 x 10⁻¹⁰ - 1575 Torr (30 psi)

1373 1011 (30 ps

Reliability (MTTF) 100000 operations Weight 180 g / 6.3 oz

PVPK Pneumatic Operation Isolation Valve

The range of single acting cylinder, spring return pipeline valves is designed for high speed actuation from standard pneumatic lines, and are offered in sizes NW10, 16, 25, 40 and 50. The NW16, 25, 40 and 50 versions of the valve are available in both right-angle and in-line styles, to give you more options when you design your vacuum system.

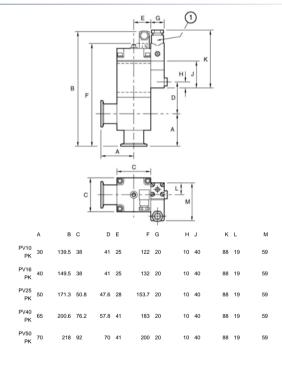
The valves are designed for long life duties, with a MTTF of 5000000 cycles for both bellows and 'O' ring sealed versions providing long intervals between services.

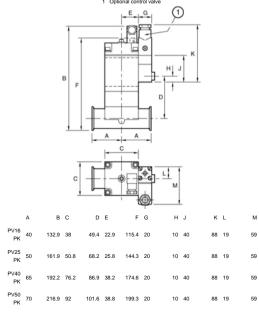


Features & Benefits

- Improved lifetime, mean-time-to-failure now 5000000 cycles
- Right-angle and in-line versions available
- Fast acting 20 ms to close (PV16)
- Available in aluminum or stainless steel
- . Choice of bellows or 'O' ring shaft sealing with aluminum bodies

Dimensions





1 Optional control val

5

	Valve actuation type	Single acting, pneumatically opened, spring closed
	Pressure range	1 x 10 ⁻⁹ to 2000 mbar / 8 x 10 ⁻¹⁰ to 1500 Torr
	Max pressure differential	
	Opening	1000 mbar / 750 Torr
	Closing	2000 mbar / 1500 Torr
	Leak rate	$< 1 \times 10^{-9}$ mbar $ s^{-1} / < 8 \times 10^{-10}$ Torr $ s^{-1} $
	Pneumatic connector	Rp 1/8 (1/8 inch BSP) *
	Pneumatic operating pressure	2.8 to 4.2 bar / 41 to 61 psi
	Electrical indicator	Single microswitch ‡
	Microswitch electrical rating	24 V, 1.5 A a.c. or d.c.
	Max cycle frequency	900 h ⁻¹
Ī	Bellows reliability, MTTF	5000000 cycles
	Ambient operating temp	5 - 100 °C
	Maximum baking temp	100 °C
	Construction materials	
	IPVPKA/PVPKA	HE30TF aluminium
	IPVPKS/PVPKS	AISI304 stainless steel
	Bellows	AISI316L stainless steel
	Molecular conductance (I s ⁻¹)	Right angled (in-line)
	PV10PK	3
	PV16PK	4 (2)
	PV25PK	10 (6)
	PV40PK	40 (18)
	PV50PK	50 (30)
	Time to open (ms) *	60
	Time to close (ms) *	20
	Weight	310g/10.9oz

- With optional control valve fitted.
 Twin microswitch versions are available on request.

Product Description	Order No.
PV16PKA, bellows sealed, aluminium	C41211000
PV16PKAO, O-ring sealed, aluminium	C41213000
PV16PKS, bellows sealed, stainless steel	C41215000
PV10PKA, bellows sealed, aluminium	C41111000
PV10PKAO, O-ring sealed, aluminium	C41113000
PV25PKA, bellows sealed, aluminium	C41311000
PV25PKS, bellows sealed, stainless steel	C41315000
PV25PKAO, O-ring sealed, aluminium	C41313000
PV40PKA, bellows sealed, aluminium	C41411000
PV40PKAO, O-ring sealed, aluminium	C41413000
PV40PKS, bellows sealed, stainless steel	C41415000
PV50PKA, bellows sealed, aluminium	C41510000
PV50PKS, bellows sealed, stainless steel	C41515000

The Edwards range of single acting cylinder, spring return pipeline valves are designed for high speed actuation from standard pneumatic lines, and are offered in sizes NW10, 16, 25, 40 and 50. The NW16, 25, 40 and 50 versions of the valve are available in both right-angle and in-line styles, to give you more options when you design your vacuum system.

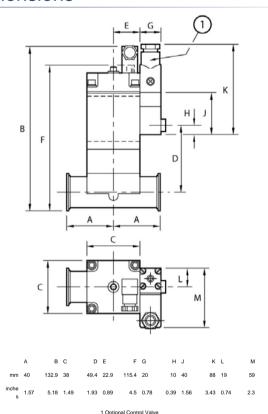
The valves are designed for long life duties, with a MTTF of 5000000 cycles for both bellows and 'O' ring sealed versions providing long intervals between services.



Features & Benefits

- Improved lifetime, mean-time-to-failure now 5000000 cycles
- Right-angle and in-line versions available
- Fast acting 20 ms to close (PV16)
- Available in aluminum or stainless steel
- . Choice of bellows or 'O' ring shaft sealing with aluminum bodies

Dimensions



Technical Data

Single acting, pneumatically Valve actuation type opened, spring closed 1×10^{-9} to 2000 mbar / 8×10^{-10} Pressure range to 1500 Torr Maximum pressure differential Opening 1000 mbar / 750 Torr Closing 2000 mbar / 1500 Torr < 1 x 10⁻⁹ mbar l s Leak rate Rp 1/8 (1/8 inch BSP) * Pneumatic connector Recommended pneumatic 2.8 to 4.2 bar / 41 to 61 psi operating pressure Electrical indicator Single microswitch ‡ Microswitch electrical rating 24 V, 1.5 A a.c. or d.c.

Ordering Information

Product Description	Order No.
IPV16PKA, bellows sealed, aluminium	C41601000
IPV16PKS, bellows sealed, stainless steel	C41602000
IPV16PKAO, O-ring sealed, aluminium	C41603000
IPV25PKA, bellows sealed, aluminium	C41621000
IPV25PKS, bellows sealed, stainless steel	C41622000
IPV25PKAO, O-ring sealed, aluminium	C41623000
IPV40PKA, bellows sealed, aluminium	C41641000
IPV40PKS, bellows sealed, stainless steel	C41642000
IPV40PKAO, O-ring sealed, aluminium	C41643000
IPV50PKS, bellows sealed, stainless steel	C41620000

5

900 h⁻¹ Max cycle frequency

5000000 cycles Bellows reliability, MTTF Ambient operating temperature 5 - 100 °C 100 °C Maximum baking temperature

Construction materials

IPVPKA HE30TF aluminum Bellows AISI316L stainless steel

2 Molecular conductance (I s⁻¹) Time to open (ms) * 60 Time to close (ms) * 20

Weight 310g/10.9oz

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^{*} With optional control valve fitted. ‡ Twin microswitch versions are available on request.

PVEK Solenoid Opeartion Isolation valves

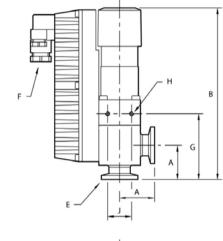
The Edwards PVEK series valves are compact, light-weight electromagnetic vacuum valves suitable for use in vacuum pipeline systems down to 1 x 10° mbar. A double wound coil combined with an electronic switching circuit ensures low energy consumption, low operating temperatures and extended operating life.

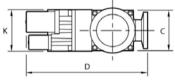
Bellows sealed, the PVEK solenoid operated valves are available with either aluminum (A) or stainless steel (S) bodies, and in right-angle (PVEK) and in-line (IPVEK) versions, with an overall MTTF of up to 500,000 cycles.

Features & Benefits

- Transient high power for opening electronically switched
- Low energy consumption in the 'hold open' position
- Enclosure rating to IP55
- Grease free vacuum
- MTTF up to 500000 cycles

Dimensions





mm	30	150	38	116	NW10	59	M4 x 7	20	41
inches	1.17	5.85	1.48	4.52	NW10	2.3	M4 x 7	0.78	1.6

F Connectors for electrical supply and reed switch cables

5

Valve actuation type	Single acting, electrically opened, spring closed
Pressure range valve open	1 x 10 ⁻⁹ to 2000 mbar / 7.5 x 10 ⁻¹⁰ to 1500 Torr (30 psi)
Maximum press differential	` ' '
opening/closing	1000 mbar / 750 Torr
Leak rate	$< 1 \times 10^{-9} \text{ mbar l s}^{-1} / < 7.5 \times 10^{-1}$ Torr l s
Reed switch (peak ratings)	
Maximum voltage	24 V a.c. or d.c.
Maximum current	0.25 A
Maximum power	3 VA
Maximum cycle frequency	400 h ⁻¹
Ambient operating temperature	5 °C to 45 °C
Valve temperature above ambient	
Rapid cycling	<24 °C
Valve open	<10 °C
Bellows reliability MTTF	500000 cycles
Construction materials	
PVEKA	HE30TF aluminum
Bellows	AISI316L stainless steel
O-ring	Fluoroelastomer
Molecular conductance (I s ⁻¹)	3
Time to open (ms)	40
Time to close (ms)	100
Operating power (VA)	
220 V a.c. at 25 °C pulse	417
220 V a.c. at 25 °C hold	4.7
Maximum continuous power 220 V a.c. rms (W)	4.5
Weight (g/oz)	800/28

Product Description	Order No.
PV10EKA, 220-240V 1-ph 50/60Hz, aluminium	C41101000
PV10EKA, 220-240V 1-ph 50/60Hz, aluminium	C41103000
PV16EKA, 220-240V 1-ph 50/60Hz, aluminium	C41201000
PV16EKS, 220-240V 1-ph 50/60Hz, stainless steel	C41202000
PV16EKA, 110-127V 1-ph 50/60Hz, aluminium	C41203000
PV16EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41204000
PV25EKA, 220-240V 1-ph 50/60Hz, aluminium	C41301000
PV25EKS, 220-240V 1-ph 50/60Hz, stainless steel	C41302000
PV25EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41304000
PV25EKA, 110-127V 1-ph 50/60Hz, aluminium	C41303000
PV40EKA, 220-240V 1-ph 50/60Hz, aluminium	C41401000
PV40EKS, 220-240V 1-ph 50/60Hz, stainless steel	C41402000
PV40EKA, 110-127V 1-ph 50/60Hz, aluminium	C41403000
PV40EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41404000

IPVEK Solenoid Operation Isolation valves

The Edwards PVEK series valves are compact, light-weight electromagnetic vacuum valves suitable for use in vacuum pipeline systems down to 1 x 10⁻⁹ mbar. A double wound coil combined with an electronic switching circuit ensures low energy consumption, low operating temperatures and extended operating life.

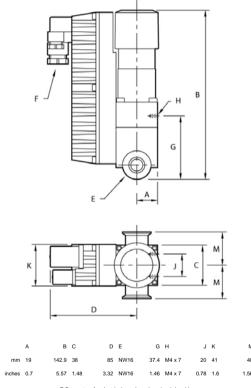
Bellows sealed, the PVEK solenoid operated valves are available with either aluminum (A) or stainless steel (S) bodies, and in right-angle (PVEK) and in-line (IPVEK) versions, with an overall MTTF of up to 500,000 cycles.



Features & Benefits

- Transient high power for opening electronically switched
- Low energy consumption in the 'hold open' position
- Enclosure rating to IP55
- Grease free vacuum
- MTTF up to 500000 cycles

Dimensions



Valve actuation type	Single acting, electrically opened, spring closed	
Pressure range valve open	1×10^{-9} to 2000 mbar / 7.5 x 10 to 1500 Torr (30 psi)	
Maximum press differential		
Opening/closing	1000 mbar / 750 Torr	
Leak rate	$< 1 \times 10^{-9}$ mbar I s- 1 / $< 7.5 \times 10^{-10}$ Torr I s ⁻¹	
Reed switch (peak ratings)		
Maximum voltage	24 V a.c. or d.c.	
Maximum current	0.25 A	
Maximum power	3 VA	
Maximum cycle frequency	400 h ⁻¹	
Ambient operating temperature	5 °C to 45 °C	
Valve temperature above ambient		
Rapid cycling	<25 °C	
Valve open	<10 °C	
Bellows reliability MTTF	500000 cycles	
Construction materials		
IPVEKA	HE30TF aluminum	
Bellows	AISI316L stainless steel	
O-ring	Fluoroelastomer	
Molecular conductance (I s ⁻¹)	2	
Time to open (ms)	40	
Time to close (ms)	100	
Operating power (VA)		
220 V a.c. at 25 °C pulse	417	
220 V a.c. at 25 °C hold	4.7	
Maximum continuous power 220 V a.c. rms (W)	4.5	
Weight (g/oz)	800/28	

Product Description	Order No.
IPV16EKA, 220-240V, 1-ph 50/60Hz, aluminium	C41610000
IPV16EKA, 110-127V 1-ph 50/60Hz, aluminium	C41611000
IPV16EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41613000
IPV25EKA, 220-240V 1-ph 50/60Hz, aluminium	C41630000
IPV25EKA, 110-127V 1-ph 50/60Hz, aluminium	C41631000
IPV25EKS, 220-240V 1-ph 50/60Hz, stainless steel	C41632000
IPV25EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41633000
IPV40EKA, 220-240V 1-ph 50/60Hz, aluminium	C41651000
IPV40EKA, 110-127V 1-ph 50/60Hz, aluminium	C41652000
IPV40EKS, 220-240V 1-ph 50/60Hz, stainless steel	C41653000
IPV40EKS, 110-127V 1-ph 50/60Hz, stainless steel	C41654000

Edwards' aluminum LCPVEK valves are designed for vacuum applications which need a compact, simple, solenoid operation valve to control gas flow. These economical valves are ideal for a number of duties ranging from simple laboratory pump isolation to OEM vacuum system integration and design. Their versatility makes them effective both in vacuum pipelines and in chamber admittance applications.

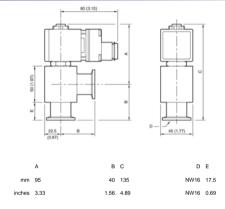
Careful design of the solenoid power control and vacuum isolation components delivers efficient magnetic actuation with optimum vacuum performance at an affordable price. This facilitates the use of an electrically actuated valve in many applications where previously this had been uneconomic.



Features & Benefits

- Economical design can be used in low budget applications
- Electrical actuation
- Low power requirements
- Electronic boost power supply
- · Efficient magnetic design

Dimensions



Technical Data

Valve actuation type
Single acting, electrically opened, spring return

Molecular conductance
3 I s⁻¹

Pressure range $1 \times 10^{-6} - 1000 \text{ mbar} / 7.5 \times 10^{-7}$

- 750 Torr

Maximum pressure differential (open/close) 1000 mbar / 750 Torr

Time to open 60 ms
Time to close <20 ms

Max cycle frequency 1800 h

Leak rate $\frac{< 1 \times 10^{-6} \text{ mbar l s}^{-1}}{7 \text{ Torr l s}^{-1}} / < 7.5 \times 10^{-6}$

Power consumption

Open 95 W for 60 ms Hold 2.5 to 4 W Reliability (MTTF) 500000 cycles Operating temperature range 5 to 45 $^{\circ}$ C Weight 810g / 28oz Enclosure rating IP67 Voltage 230 V ±10%

Construction materials

Body Aluminium, stainless steel

Seals Fluoroelastomer

Product Description	Order No.
LCPV16EKA, 230V 50/60Hz aluminium	C41751000
LCPV16EKA, 110V, 50/60Hz, aluminium	C41751100
LCPV16EKA, 24V ac,dc, aluminium	C41751200
LCPV25EKA, 230V, 50/60Hz, aluminium	C41752000
LCPV25EKA, 110V 50/60Hz, aluminium	C41752100
LCPV25EKA, 24V ac,dc, aluminium	C41752200



Edwards backing/roughing valves with ISO NW roughing and forepump terminations feature manual or pneumatic actuation. They combine the function of separate backing/roughing valves in one integral 3 port unit.

A flexible neoprene connector is supplied for the backing connection. The roughing and forepump ports terminate in the appropriate NW termination.

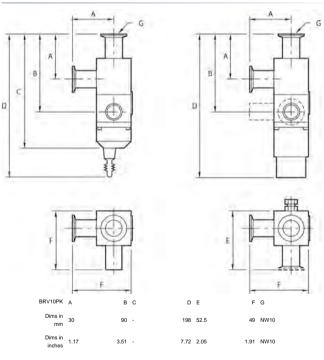
Features & Benefits

- Easy to operate both ports closed position
- Long life 100,000 operations or more
- Position indicator on pneumatic valve
- Leak tight to better than 10⁻⁹ mbar Is ⁻¹/8 x 10⁻¹⁰ Torr Is ⁻¹

Page

5

Dimensions



Applications

The valves have been designed particularly for the Diffstak® pumping systems, but have applications where a compact change-over valve is required in the pressure range 10^{-7} - 2000 mbar / 8 x 10⁻⁸ - 1500 Torr.

Ordering Information

Product Description	Order No.
BRV10PK Backing/Roughing Valve Pneumatic Operation	C32104000
BRV10K, Manual Operation	C32103000
BRV25K Backing/Roughing Valve, Manual Operation	C32303000
BRV25PK Backing/Roughing Valve, Pneumatic Operation, NW25 Flanges	C32303500
BRV25PK Backing/Roughing Valve, Pneumatic Operation	C32304000
BRV25PK Backing/Roughing Valve, Pneumatic Operation, In-line Flanges	C32304900

Technical Data

Construction materials

Body and pneumatic cylinder Lever and bonnet (manual)

Operating shaft/valve seat

Body seals, port seals, shaft seal 'O' ring

Leak rate

Overall

Across ports

HE 30TF aluminum

Glass reinforced plastic

Stainless steel

Fluoroelastomer

 $< 10^{-9} \, \text{mbar I}^{s-1} /$ < 8 x 10-10 Torr I s⁻¹

< 10⁻⁹ mbar I s-1 /

Shop online at www.edwardsvacuum.com

< 8 x 10-10 Torr | s⁻¹ < 10⁻⁹ mbar | s-1 / NW coupling

< 8 x 10-10 Torr I s⁻¹

 10^{-7} - 2000 mbar / 8 x 10^{-8} -Operating pressure range

1500 Torr Maximum baking temperature 70 °C

Reliability (MTTF) 100000 cycles

2.8 - 4.2 bar / 40.6 - 61 psi Recommended air pressure

Maximum air pressure 7.0 bar / 102 psi 2.4 bar / 35 psi Minimum air pressure

1/8 in BSP, for 6 mm Ø plastic Air connections

or copper tube

Microswitch rating 24 V 1.5 A a.c. or d.c.

Weight 380g / 13oz

SIPVP Soft-Start Isolation Valves





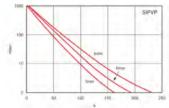
Soft-start, pneumatically operated, valves with interchangeable orifices for the controlled pumpdown of processes where turbulent flow can cause problems with particulate contamination.

Slave and master valve combination allows slow initial pumping to minimise disturbance. Both slave and master vlaves require separate pneumatic connections.

Features & Benefits

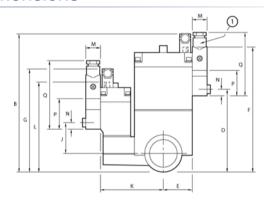
- MTTF of 5000000 cycles
- Controlled pump down to match process
- Aluminum bodies
- · Fast acting valves in the event of power failure
- Supplied with 5 mm, 6 mm and 7 mm interchangeable orifices

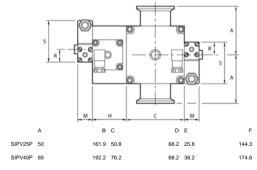
Performance Curves



Typical pump-down curve of initial pumping phase with 80 m3h-1 pump on a 66l chambe

Dimensions





 $G\!=\!145,\,H\!=\!43.5,\,J\!=\!49,\,K\!=\!86,\,L\!=\!127,\,M\!=\!20,\,N\!=\!10,\,P\!=\!40,\,Q\!=\!88,\,R\!=\!19,\,S\!=\!59$

Ordering Information

Product Description	Order No.	
SIPV25P, pneumatic, bellows sealed, aluminium body	C41624000	
SIPV40P, pneumatic, bellows sealed, aluminium body	C41644000	

5

Valve actuation type Single acting, pneumatically opened, spring closed

Pressure range 1 x 10⁻⁹ to 2000 mbar / 8 x 10⁻¹⁰ to 1500 Torr

Maximum pressure differential

Opening 1000 mbar / 750 Torr
Closing 2000 mbar / 1500 Torr

Leak rate "mbar I s - 1 / -10 Torr I s - 1

Pneumatic connector Rp 1/8 (1/8 inch BSP)1

Pneumatic operating pressure 2.8 to 4.2 bar / 41 to 61 psi

Flectrical indicator Single microswitch

Electrical indicator Single microswitch

Microswitch electrical rating 24 V, 1.5 A a.c. or d.c.

 $\begin{array}{ll} \text{Max cycle frequency} & 900 \text{ h}^{\text{-1}} \\ \text{Bellows reliability, MTTF} & 5000000 \text{ cycles} \\ \text{Ambient operating temperature} & 5 - 100 \text{ °C} \\ \text{Maximum baking temperature} & 100 \text{ °C} \\ \end{array}$

Construction materials HE30TF aluminum
O-ring Fluoroelastomer
Time to open/close at 4 bar (ms) SIPV25P (SIPV40P)

Slave valve 60/20 (60/20) Master valve 15/41 (50/155)

Weight

SIPV25P 920 g/32 oz SIPV40P 1760/62

GVI Gate Valve



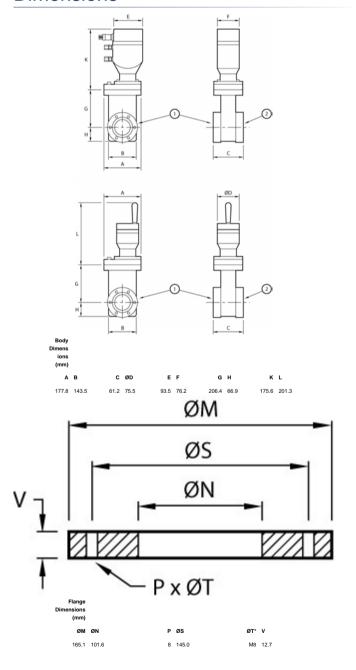
The Edwards GV range of stainless steel bellows sealed gate valves are designed for applications requiring overall leak tightness and a minimum of hydrocarbon in the residual atmosphere. These superior quality valves offer high vacuum integrity coupled with maximum conductance.

This product is fitted with a reed switch position indicator

Features & Benefits

- In situ removal of gate and linkage mechanism for easy servicing
- Virtual leaks eliminated due to vacuum brazed manufacture
- Electropolished finish inside and outside
- Compact design with high conductance
- Pneumatic actuation

Dimensions



Pressure range	10 ⁻⁹ mbar to 1 bar (absolute)	
	8 x 10 ⁻¹⁰ - 750 Torr	
Leak rate	< 10 ⁻⁹ mbar I s ⁻¹	
	8 x 10 ⁻¹⁰ Torr I s ⁻¹	
Maximum differential pressure on the valve plate	1 bar / 750 Torr in either direction	
Maximum differential pressure on the valve plate at opening	20 mbar / 15 Torr	
Position indicator switch, breaking capacity	24 V d.c., 5 A	
Material of construction		
Body, valve plate	AISI 304 stainless steel	
Mechanism	AISI 304 stainless steel,	
Bearings	Hardened high carbon chrome steel	
Circlips	SS PH 15-7 Mo	
Bellows	AM 350 stainless steel	
Seals, valve plate	Fluoroelastomer	
Bonnet		
Metal sealed valves	OFHC	
Other valves	Fluoroelastomer	
Bakeout temperature		
Valve body, valve open	150 °C (fluoroelastomer bonnet seal)	
Valve body, valve open	250 °C (metal bonnet seal)	
Valve closed	200 °C	
Actuator, pneumatic	100 °C	
Average life until first service*	100000 closures	
Mounting position	Any orientation	
Pneumatic operating pressure	4 - 5.5 bar / 60 - 80 psi	
Flange bore	100 mm	
	4 in	
Conductance in high vacuum	2000 l s ⁻¹	
Pneumatic valve minimum closing		
and opening time at 5 bar.	1.5 s	
Approx weight	15 kg	

 $^{^{\}star}$ Dependent on the vacuum environment and the opening and closing speed.

Product Description	Order No.
GVI100, Pneumatic Operation, ISO100 Flange, Reed Switch	B65354000
GVI160, Pneumatic Operation, ISO160 Flange, Reed Switch	B65454000
GVI063, Pneumatic Operation, ISO63 Flange, Reed switch	B65254000
GVI040, Manual Operation, NW40 Flange	B65001000
GVI040, Pneumatic Operation, NW40 Flange	B65051000
GVI050 Gate Valve, Manual Operation, NW50 Flange	B65101000
GVI050, Pneumatic Operation, NW50 Flange	B65151000
GVI063, Manual Operation, ISO63 Flange	B65201000
GVI063, Pneumatic Operation, ISO63 Flange	B65251000
GVI100, Manual Operation, ISO100 Flange	B65301000
GVI100, Pneumatic Operation, ISO100 Flange	B65351000
GVI160, Manual Operation, ISO160 Flange	B65401000
GVI160, Pneumatic Operation, ISO160 Flange	B65451000
GVI200, Manual Operation, ISO200 Flange	B65501000
GVI200, Pneumatic Operation, ISO200 Flange	B65551000
GVI250 Manual Operation, ISO250 Flange	B65601000
GVI250, Pneumatic Operation, ISO250 Flange	B65651000
GVI320, Manual Operation, ISO320 Flange	B65701000
GVI320, Pneumatic Operation, ISO320 Flange	B65751000

GVC Gate Valve

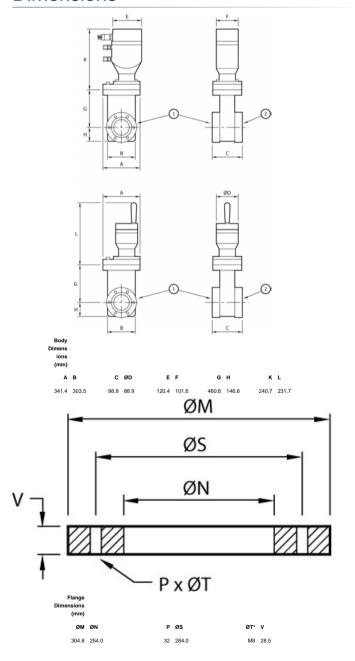


The Edwards GV range of stainless steel bellows sealed gate valves are designed for applications requiring overall leak tightness and a minimum of hydrocarbon in the residual atmosphere. These superior quality valves offer high vacuum integrity coupled with maximum conductance.

Features & Benefits

- In situ removal of gate and linkage mechanism for easy servicing
- Virtual leaks eliminated due to vacuum brazed manufacture
- Electropolished finish inside and outside
- Compact design with high conductance
- Manual actuation

Dimensions



Pressure range	10 ⁻⁹ mbar to 1 bar (absolute)
	8 x 10 ⁻¹⁰ - 750 Torr
Leak rate	< 10 mbar l s
	8 x 10 ⁻¹⁰ Torr I s
Maximum differential pressure on the valve plate	1 bar / 750 Torr in either direction
Maximum differential pressure on the valve plate at opening	20 mbar / 15 Torr
Material of construction	
Body, valve plate	AISI 304 stainless steel
Mechanism	AISI 304 stainless steel,
Bearings	Hardened high carbon chrome steel
Circlips	SS PH 15-7 Mo
Bellows	AM 350 stainless steel
Seals, valve plate	Fluoroelastomer
Bonnet	
Metal sealed valves	OFHC
Other valves	Fluoroelastomer
Bakeout temperature	
Valve body, valve open	150 °C (fluoroelastomer bonnet seal)
Valve body, valve open	250 °C (metal bonnet seal)
Valve closed	200 °C
Actuator, manual	200 °C
Average life until first service*	100000 closures
Mounting position	Any orientation
Flange bore	250 mm
	10 in
Conductance in high vacuum	23000 l s ⁻¹
Approx weight	73 kg

 $[\]ensuremath{^\star}$ Dependent on the vacuum environment and the opening and closing speed.

Product Description	Order No.	
GVC100, Manual Operation, 12.00 Inch O/D CF Flange	B65603000	
GVC120, Manual Operation, 14.00 Inch O/D CF Flange	B65703000	
GVC120, Pneumatic Operation, 14.00 Inch O/D CF Flange	B65753000	
GVC015, Manual Operation, 2.37 Inch O/D CF Flange	B65003000	
GVC015, Pneumatic Operation, 2.37 Inch O/D CF Flange	B65053000	
GVC020, Manual Operation, 3.37 Inch O/D CF Flange	B65103000	
GVC020, Pneumatic Operation, 3.37 Inch O/D CF Flange	B65153000	
GVC025, Manual Operation, 4.47 Inch O/D CF Flange	B65203000	
GVC025, Pneumatic Operation, 4.47 Inch O/D CF Flange	B65253000	
GVC040, Manual Operation, 6.00 Inch O/D CF Flange	B65303000	
GVC040, Pneumatic Operation, 6.00 Inch O/D CF Flange	B65353000	
GVC060, Manual Operation, 8.00 Inch O/D CF Flange	B65403000	
GVC060, Pneumatic Operation, 8.00 Inch O/D CF Flange	B65453000	
GVC080, Manual Operation, 10.00 Inch O/D CF Flange	B65503000	
GVC080, Pneumatic Operation, 10.00 Inch O/D CF Flange	B65553000	
GVC100, Pneumatic Operation, 12.00 Inch O/D CF Flange	B65653000	



The BGV basement gate valves are a range of stainless steel, bellows-sealed basement isolation valves. They have been designed, in conjunction with VAT, to enable pumps to be kept running during foreline maintenance in order to maximise the reliability and up-time of pumps operating on harsh processes. The BGV valves are designed for an operating pressure range of 1 x 10° mbar to 1.2 bar absolute (1 x 10° to 1.2 x 10° Pa). The valves withstand 1.2 bar absolute in either direction and can tolerate against a 1 bar differential pressure across the valve seal.

Although principally designed for isolation of pumps in a semiconductor fab basement, the

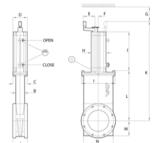
Features & Benefits

Dimensions

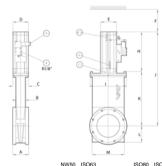
Jointly developed with VAT, a world leader in sealing technology.

Stainless steel construction and robust patented design for a long service life

- Simple grease-free mechanism minimizes damage due to particulates in dusty processes
- Can be operated with 1 bar pressure differential so pressure equalization is not required
- Easy servicing with only inexpensive consumables for low cost of ownership



		NW50	ISO63	ISO80	ISO100	ISO160
Α	mm/inch	60/2.36	70/2.75	70/2.75	70/2.75	90/3.54
В	mm/inch	36/1.41	43/1.69	43/1.69	43/1.69	64/2.52
С	mm/inch	63/2.48	69/2.71	69/2.71	69/2.71	87/3.42
D	mm/inch	60/2.36	68/2.67	68/2.67	68/2.67	87/3.42
Е	mm/inch	21/0.83	57/2.24	57/2.24	57/2.24	73/2.87
F	mm/inch	13/0.51	15.5/0.61	15.5 /0.61	15.5/0.61	20.3/0.8
G	mm/inch	120/4.71	160/6.3	200/7.87	200/7.87	260/10.23
Н	mm/inch	62.5/2.44	71/2.79	71/2.79	71/2.79	91/3.58
-1	mm/inch	110/4.33	123/4.84	142/5.58	160/6.3	210/8.26
J	mm/inch	134/5.28	149/5.86	165/6.49	185/7.28	264/10.39
K	mm/inch	325/12.80	375/14.76	424/16.66	474/18.66	651/25.62
L	mm/inch	149/5.86	176/6.92	209/8.21	239/9.4	337/13.27
М	mm/inch	45/1.77	53.5/2.1	72/2.83	72/2.83	97/3.83
N	mm/inch	90/3.54	105/4.13	124/4.87	142/5.59	192/7.55



		144730	13003	13000	130100	130100
Α	mm/inch	60/2.36	70/2.75	70/2.75	70/2.75	90/3.54
В	mm/inch	36/1.41	43/1.69	43/1.69	43/1.69	64/2.52
С	mm/inch	63/2.48	69/2.71	69/2.71	69/2.71	87/3.42
D	mm/inch	60/2.36	68/2.67	68/2.67	68/2.67	87/3.42
Е	mm/inch	62.5/2.46	71/2.79	71/2.79	71/2.79	91/3.58
F	mm/inch	120/4.71	160/6.3	200/7.87	200/7.87	260/10.23
G	mm/inch	77/3.03	82/3.22	82/3.22	82/3.22	92/3.62
Н	mm/inch	119/4.68	138/5.43	155/6.09	174.5/6.87	241/9.48
-1	mm/inch	110/4.32	123/4.84	142/5.58	160/6.3	210/8.26
J	mm/inch	268/10.53	314/12.36	364/14.31	413.5/16.27	578/22.75
K	mm/inch	149/5.86	176/6.92	209/8.21	239/9.4	337/13.27
L	mm/inch	45/1.77	68/2.68	72/2.83	83/3.27	113/4.45
М	mm/inch	90/3.54	105/4.13	124/4.87	142/5.59	192/7.55

Technical Data

Leak rate	
Body	< 1 x 10 ⁻⁹ mbar ls
Valve seat	< 1 x 10 ⁻⁷ mbar ls
Pressure range	1 x 10 ⁻⁹ mbar to 1.2 bar (abs)
Differential pressure on the gate	
Differential pressure at opening	
Cycles until first service	20, 0000
Maximum operating temps	
Valve body	£ 120 °C
Manual actuator	£ 80 °C
Pneumatic actuator	£ 80 °C
Position indicator	£ 60 °C
Solenoid	£ 50 °C
Molecular flow conductance	
NW50	300 ls ⁻¹
ISO63	400 ls -1
ISO80	1000 ls ⁻¹
ISO100	1700 ls -1
ISO160	
	4600 ls ⁻¹
Weight NW50	3.3 kg (7.3 lbs)
ISO63	6.6 kg (14.6 lbs)
ISO80	7.0 kg (15.4 lbs)
ISO100	8.5 kg (18.7 lbs)
ISO160	17.7 kg (39.0 lbs)
Materials of construction:	17.7 kg (39.0 lbs)
Body	AISI 304 stainless steel
Bonnet	Black anodized aluminum
Gate	AISI 304 stainless steel
Gliders	PEEK
Bellows	AISI 633 stainless steel
Seals	Fluoroelastomer
Couls	Fixation screw A2 stainless steel
Gate	Ni-teflon coated
Handle	Reinforced polyamide
Pneumatic valves	
Solenoid rating	
Standard solenoid	24 V - 15% / + 10%, AC/DC, 2.4 W
Position indicator contact rating	12 - 30 V AC/DC, max 500 mA, max 10 W
Pneumatic supply	
Min supply pressure	58 psig (4 bar gauge, 5 bar absolute, 5 x 10 ⁵ Pa)
Max supply pressure	100 psig (7 bar gauge, 8 bar absolute, 8 x 10 ⁵ Pa)
Pneumatic connection	R1/8 inch (1/8 inch NPT for valves ordered in USA)

Ordering Information

Product Description	Order No.
BGV manual gate valve NW50	B90000195
BGV manual gate valve ISO63	B90000200
BGV manual gate valve ISO80	B90000215
BGV manual gate valve ISO100	B90000220
BGV manual gate valve ISO160	B90000230
BGV pneumatic gate valve NW50	B90003105
BGV pneumatic gate valve ISO63	B90003110
BGV pneumatic gate valve ISO80	B90003125
BGV pneumatic gate valve ISO100	B90003130
BGV pneumatic gate valve ISO160	B90003140
201 piloumano gato varro 100 100	
Accessories & Spares	Order No.
	Order No. B90000640
Accessories & Spares	
Accessories & Spares Bellows feed-through ISO100	B90000640
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO160	B90000640 B90000650
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO160 Bellows feed-through ISO63	B90000640 B90000650 B90000630
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO160 Bellows feed-through ISO63 Bellows feed-through ISO80	B90000640 B90000650 B90000630 B90000635
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO63 Bellows feed-through ISO80 Bellows feed-through NW50	B90000640 B90000650 B90000630 B90000635 B90000625
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO63 Bellows feed-through ISO80 Bellows feed-through NW50 Vacuum seals kit ISO100	B90000640 B90000650 B90000630 B90000635 B90000625 B90000610
Accessories & Spares Bellows feed-through ISO100 Bellows feed-through ISO63 Bellows feed-through ISO80 Bellows feed-through ISO80 Bellows feed-through NW50 Vacuum seals kit ISO100 Vacuum seals kit ISO160	B90000640 B90000650 B90000630 B90000635 B90000625 B90000610 B90000620

The Edwards GV range of stainless steel, bellows sealed gate valves is designed for applications requiring overall leak tightness and a minimum of hydrocarbon in the residual atmosphere.

These superior quality valves offer high vacuum integrity coupled with maximum conductance. The valves are available with flange options of ISO, ANSI or CF (metal sealed) for applications at ultra high vacuum requiring increased bakeout temperatures.

The stainless steel valve bodies are vacuum brazed, a special process which includes a bakeout at 1100 °C. This eliminates any possibility of virtual leaks and ensures a product with low outgassing characteristics.

A laser welded stainless steel bellows effectively seals the actuator from the valve. The concept provides ease of servicing and allows the gate and linkage mechanism to be removed while the valve remains in situ.

Features & Benefits

- · In situ removal of gate and linkage mechanism for easy servicing
- · Virtual leaks eliminated due to vacuum brazed manufacture
- · Electropolished finish inside and outside
- · Compact design with high conductance
- Manual or pneumatic options
- Microswitch position indicator as standard on pneumatic version
- · Long periods of use between maintenance
- · Low vibration and shock
- · Free choice of orientation
- Wide range from 40 mm / 1.56 inch bore up to 320 mm / 12.48 inch bore
- Flange options ISO, ASA or CF (metal sealed)
- High reliability 1000000 cycle option
- · Optional 3 position operation
- Vacuum brazed to 1100 °C to eliminate virtual leaks

Technical Data

Pressure range	10 ⁻⁹ mbar to 1 bar (absolute) <i>i</i> 8 x 10 ⁻¹⁰ – 750 Torr
Leak rate	< 10 ⁻⁹ mbar I s ⁻¹ /

8 x 10⁻¹⁰ Torr I s⁻¹

Maximum differential pressure on the valve plate 1 bar / 750 Torr in either direction Maximum differential pressure

on the valve plate at opening
Position indicator switch,
breaking capacity

Material of construction

20 mbar / 15 Torr
24 V d.c., 5 A

Body, valve plate AISI 304 stainless steel Mechanism AISI 304 stainless steel

Bearings Hardened high carbon chrome steel Circlips SS PH 15-7 Mo

Bellows AM 350 stainless steel
Seals, valve plate Fluoroelastomer

Bonnet

Metal sealed valves OFHC

Other valves Fluoroelastomer

Bakeout temperature

Valve body, valve open 150 °C (fluoroelastomer bonnet

seal)

Valve body, valve open 250 °C (metal bonnet seal)

Valve closed 200 °C

Actuator, manual 200 °C

Actuator, pneumatic 100 °C

Average life until first service* 100000 closures

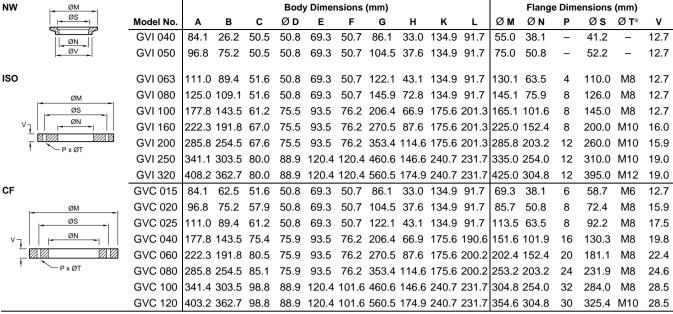
Mounting position Any orientation

Pneumatic operating pressure 4-5.5 bar /60-80 psi

* Dependent on the vacuum environment and the opening and closing speed

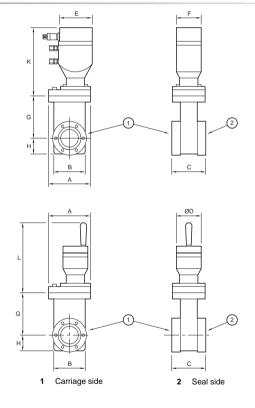
Flange	e Bore	Conductance in	Pneumatic Valve	Approx
mm	in	High Vacuum I s ⁻¹	Minimum Closing & Opening Time at 5 bar, Seconds	Weight, kg
40	1.5	130	0.5	5
50	2	250	0.5	6
63	2.5	520	1	8
100	4	2000	1.5	15
160	6	6300	1.5	23
200	8	15000	2 (close)	34
			3 (open)	
250	10	23000	3 (close)	73
			4 (open)	
320	12	39000	3 (close)	77
			4 (open)	

^{*} Special versions available, including 1 million cycle types, 3 position types, larger valves, and pneumatic versions with reed switch position indicators.



^{*} For the ANSI flange valves, the dimensions given define the diameter of the flange holes in inches and the pitch of the screw thread. For example, %-16 denotes a hole diameter of % inch and a pitch of 16 threads per inch.

Dimensions



Ordering Information

			No.		No.
Type	Model	Flange seals	seals*	Fixing kit	kits [†]
ISO	GVI 063	B27158170	1	B22417187	1
	GVI 100	B27158171	1	B22417187	2
	GVI 160	B27158172	1	B22417217	2
	GVI 200	B27158081	1	B22417217	2
	GVI 250	B27158143	1	B22417247	2
	GVI 320	B27158166	1	B22417247	2
CF	GVC 015	C10001290	10	B22417157	2
	GVC 020	C10005290	10	B22417187	2
	GVC 025	C10007490	10	B22417188	2
	GVC 040	C10009290	10	B22417189	2
	GVC 060	C10011290	5	B22417190	2
	GVC 080	C10012290	5	B22417190	2
	GVC 100	C10013290	5	B22417190	2

^{*} Number of seals in each pack.

Number of fixing kits that are needed to mount both flanges of the valve.

Ordering Information

		Nor	ninal	Walana	For Valves	Manufacture Onwards	d 1996 and
		Bore mm/		Valve Ordering			Pins &
Type	Flange	in	Model	(Number)	Seal Kits	Bellow Kits	Bearing Kits
ISO Manual	NW40	40/1½	GVI040	B65001000	B65001020	B65001030	B65001040
	NW50	50/2	GVI050	B65101000	B65101020	B65001030	B65101040
	ISO63	63/21/2	GVI063	B65201000	B65201020	B65001030	B65201040
	ISO80	75/3	GVI080	N03933800	Call	Call	Call
	ISO100	100/4	GVI100	B65301000	B65301020	B65301030	B65301040
	ISO160	160/6	GVI160	B65401000	B65401020	B65301030	B65401040
	ISO200	200/8	GVI200	B65501000	B65501020	B65301030	B65501040
	ISO250	250/10	GVI250	B65601000	B65601020	B65601030	B65601040
	ISO320	320/12	GVI320	B65701000	B65701020	B65601030	B65701040
ISO	NW40	40/1½	GVI040	B65051000	B65001020	B65001030	B65001040
Pneumatic	NW50	50/2	GVI050	B65151000	B65101020	B65001030	B65101040
	ISO63	63/21/2	GVI063	B65251000	B65201020	B65001030	B65201040
	ISO80	75/3	GVI080	U30002092	Call	Call	Call
	ISO100	100/4	GVI100	B65351000	B65301020	B65301030	B65301040
	ISO160	160/6	GVI160	B65451000	B65401020	B65301030	B65401040
	ISO200	200/8	GVI200	B65551000	B65501020	B65301030	B65501040
	ISO250	250/10	GVI250	B65651000	B65601020	B65601030	B65601040
	ISO320	320/12	GVI320	B65751000	B65701020	B65601030	B65701040
CF	2.37 inch od CF	40/1½	GVC015	B65003000	B65003020	B65003030	B65001040
Manual	3.37 inch od CF	50/2	GVC020	B65103000	B65103020	B65103030	B65101040
	4.47 inch od CF	63/21/2	GVC025	B65203000	B65203020	B65203030	B65201040
	6.00 inch od CF	100/4	GVC040	B65303000	B65303020	B65303030	B65303040
	8.00 inch od CF	160/6	GVC060	B65403000	B65403020	B65403030	B65403040
	10.00 inch od CF	200/8	GVC080	B65503000	B65503020	B65503030	B65503040
	12.00 inch od CF	250/10	GVC100	B65603000	B65603020	B65603030	B65603040
	14.00 inch od CF	320/12	GVC120	B65703000	B65703020	B65703030	B65703040
CF	2.37 inch od CF	40/1½	GVC015	B65053000	B65003020	B65003030	B65001040
Pneumatic	3.37 inch od CF	50/2	GVC020	B65153000	B65103020	B65103030	B65101040
	4.47 inch od CF	63/21/2	GVC025	B65253000	B65203020	B65203030	B65201040
	6.00 inch od CF	100/4	GVC040	B65353000	B65303020	B65303030	B65303040
	8.00 inch od CF	160/6	GVC060	B65453000	B65403020	B65403030	B65403040
	10.00 inch od CF	200/8	GVC080	B65553000	B65503020	B65503030	B65503040
	2.00 inch od CF	250/10	GVC100	B65653000	B65603020	B65603030	B65603040
	14.00 inch od CF	320/12	GVC120	B65753000	B65703020	B65703030	B65703040

Seals kits contain: gate O-ring, bonnet seal and set of pneumatic actuator O-rings.
Bellows kits contain: bonnet/bellows/actuator link welded assembly, and circlips (as required).
Pins and bearings kits contain: pins, washers, bearings, springs and, as required, wheels.

The QSB quarter swing valves are compact, quick acting, high conductance isolation valves. The QSB valves have a polished, stainless steel, ISO flanged body with fluoroelastomer 'O' ring sealed valve plate and shaft. The valve plate 'O' ring groove is vented to help maintain a stable high vacuum. The valve shaft 'O' rings and bearings are lubricated with Fomblin grease to prevent gas bursts from behind the shaft seals.

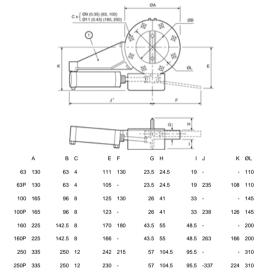
This valve is supplied with a Co-Seal.



Features & Benefits

- Manual operation
- High conductivity
- Resists atmosphere in either direction
- Compact and quick acting
- Corrosion resistant construction

Dimensions



1 Actuator cylinder support bracket (QSB63P, QSB100P and QSB160P only)

Technical Data

Microswitch connectors

Valve plate material	AISI 304 stainless steel
Operating pressure range	10 ⁻⁹ - 3000 mbar / 8 x 10 ⁻¹⁰ - 2250 Torr
Max pressure differential	1000 mbar / 750 Torr
Operating temp range	5 - 40 °C
Max baking temp	200 °C (without actuator)
Leak rate	$< 10^{-9}$ mbar s ⁻¹ / 8 x 10 ⁻¹⁰ Torr s
Pneumatic valves only:	
Reliability (MTTF)	<1.5 x 10 ⁵ cycles
Pneumatic connectors	1/8 inch BSP, for 6mm OD tube
Number of connectors	
QSB63, QSB100, QSB160	2
QSB250	1
Reed switch rating**	
Max voltage	30V
Max current	500mA
Max Power	6W
Reed switch connectors**	3m flying leads
Microswitch rating	5A at 48V

Ordering Information

Product Description	Order No.
QSB63, Manual Operation	B42402000
QSB63P, Double Pneumatic Operation	B42403000
QSB63P, Double Pneumatic Operation with reed switches	B42409000
QSB100P, Double Pneumatic Operation	B42603000
QSB100P, Double Pneumatic Operation with reed switches	B42609000
QSB100, Manual Operation	B42602000
QSB160, Manual Operation	B42802000
QSB160P, Double Pneumatic Operation	B42803000
QSB160P, Double Pneumatic Operation with reed switches	B42809000
QSB250 Quarter Swing Butterfly Valve, Manual Operation	B43002000
QSB250P, Single Pnuematic Operation	B43003000

5

Page 181 Conductance *

420 l s⁻¹

QSB63 QSB100 420 l s⁻¹ 1250 l s⁻¹

QSB160 QSB250 2700 l s⁻¹ 13000 l s⁻¹

Recommended pneumatic pressure~ (bar)

QSB63, QSB100, QSB160 2.8 to 4.2 QSB250 4 to 6

* Conductance of equivalent tube length
** Reed switch are only for QSB63P and QSB100P
~ Pneumatic operation

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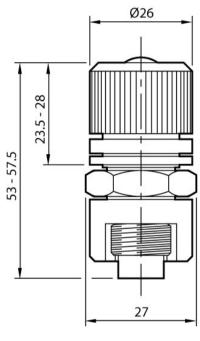
AV5A Air Admittance Valve With Couplings

The AV5A is manufactured in aluminum alloy. It has a control knob attached to a screw-actuated plunger: turn the control knob clockwise to close the valve. A nitrile 'O' ring seals the plunger to the valve body.

The valve can be connected directly, pipeline supported or panel mounted, and is connected to the vacuum system with the Edwards SC5 coupling (supplied).



Dimensions



Technical Data

Materials of construction

Body

Plunger

Seal

Leak rate across seat

Leak rate through body

Panel mounting

Vacuum connections

Weight

HE30 aluminum / nickel plated brass

HE30 aluminum

iLoo alaiiiii

Nitrile

 10^{-7} mbar Is $^{-1}$ / 8 x 10^{-8} Torr Is $^{-1}$ 10^{-1} mbar Is $^{-1}$ / 8 x 10^{-2} Torr Is $^{-1}$ Ø 17 mm / Ø 0.66 in hole, 3 mm / 0.117 in maximum thickness

SC5 couplings or 3/8 inch BSP threaded body and bonded seal

85 g/3 oz

Ordering Information

Product Description	Order No.
AV5A Air Admittance Valve With Couplings	C35003000
Accessories & Spares	Order No.
O Ring Nitrile Vor 2A Pk 10	H02105115
Dowty Seal 3/8 BSP MkC	H02104003

AV10K Air Admittance Valve



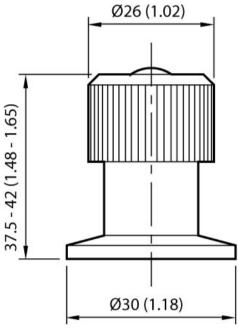
The AV10K is manufactured in aluminum alloy. It has a control knob attached to a screw-actuated plunger: turn the control knob clockwise to close the valve. A nitrile 'O' ring seals the plunger to the valve body.

The valve can be pipeline supported only, and is connected to the vacuum system with an NW10 fitting.

Dimensions

5

Page



Ordering Information

Product Description	Order No.
AV10K Air Admittance Valve	C35103000
Accessories & Spares	Order No.
O Ring Nitrile Vor 2A Pk 10	H02105115

Technical Data

Materials of construction

Body Contr

Control knob

Seal

Leak rate across seat Leak rate through body Vacuum connections

Weight

HE30 aluminum

Nylon 6

Nitrile

 10^{-7} mbar ls⁻¹ / 8 x 10^{-8} Torr ls⁻¹ 10^{-1} mbar ls⁻¹ / 8 x 10^{-2} Torr ls⁻¹

NW10

100 g / 3.5 oz

IPVA10EK Air Admit Valve

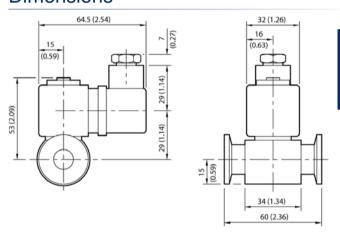
The IPVA10EK is a solenoid operated valve designed for automatic admittance of air or vent gas into a vacuum system. The valve has two ports with NW flanges. One of the valve ports is connected to the vacuum system, the other port can be left open to atmosphere or connected to a vent gas supply. The vacuum system is isolated from atmosphere (or the vent gas supply) by a fluoroelastomer pad on the base of the valve plunger, which seals against the body of the valve.



Features & Benefits

- Normally open operation
- Small envelope
- IP65 protection
- MTTF 100000 Cycles
- Normally open or normally closed option.

Dimensions



Technical Data

Coil insulation

Operating temperature range	-20 to 55 °C
Vent gas temperature range	-10 to 130 °C
Venting rate	10 liters in 12 s
Response time	30 ms
Maximum cycle frequency	100 min ⁻¹
Reliability (MTTF)	10 ⁵ cycles
Leak rate	1 x 10 ⁻⁹ mbar l s ⁻¹ / 8 x 10 ⁻¹⁰
200.1.1010	Torr I s
Electrical supply	240 a.c. 1-phase, 50/60 Hz
Tolerance	-10% to +10%
Power	9.3 VA inrush 6.3 VA hold
Enclosure rating	IP65
Weight	310 g / 11 oz
Materials of construction	
Body	Aluminum
Valve seal	Fluoroelastomer
Actuator	Stainless steel

The air or vent gas path through the valve is free from heavy metals.

Class F

Ordering Information

Product Description	Order No.
IPVA10EK, 240 V a.c. (normally open)	C41721000
IPVA10EK, 110 V a.c. (normally open)	C41722000
IPVA10EK, 24 V d.c. (normally open)	C41723000
IPVA10EK, 24 V a.c. (normally open)	C41724000
IPVA10EK, 12 V d.c. (normally open)	C41725000
IPVA10EK, 240 V a.c. (normally closed)	C41731000
IPVA10EK, 110 V a.c. (normally closed)	C41732000
IPVA10EK, 24 V d.c. (normally closed)	C41733000
IPVA10EK, 24 V a.c. (normally closed)	C41734000
IPVA10EK, 12 V d.c. (normally closed)	C41735000

LV10K Leak Valve NW10 Flanges

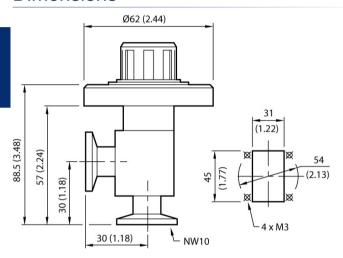


The LV10K needle valve provides fine control of gas bleed into a vacuum chamber or a regulated leak to control pressure in a vacuum system and is suitable for gas admission down to 10 mbar / 8 x 10 Torr. Suitable for pipeline or panel mounting.

Dimensions

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Ordering Information

Product Description	Order No.
LV10K Leak Valve NW10 Flanges	C37102000
Accessories & Spares	Order No.
Spares Kit Valve Seat	C37102812

Technical Data

Materials	of construction	ı

Body Aluminum HE30 Seat Brass BS2784 C2112 Martensitic stainless steel Needle EN56AM Filter Brass BS249 0.1 l s⁻¹ Max flow rate (approx)* Max inlet pressure 2000 mbar / 1500 Torr 10^{-7} mbar ls⁻¹ / 8 x 10^{-8} Torr ls⁻¹ Max leak rate, across seat Max leak rate, across body 10^{-7} mbar Is $^{-1}$ / 8 x 10^{-8} Torr Is $^{-1}$ Vacuum connection NW10 138 g / 4.8 oz Weight (g/oz)

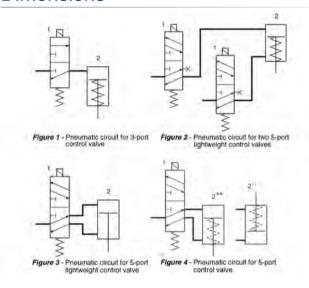
^{*} Flow rate relates to a pressure differential across valve of one bar.

Electropneumatic Control Valve

Electropneumatic control valves can be used to control the operation of pneumatically activated vacuum valves. Control valves are available with different electrical supply voltages and frequencies to suit your application.



Dimensions



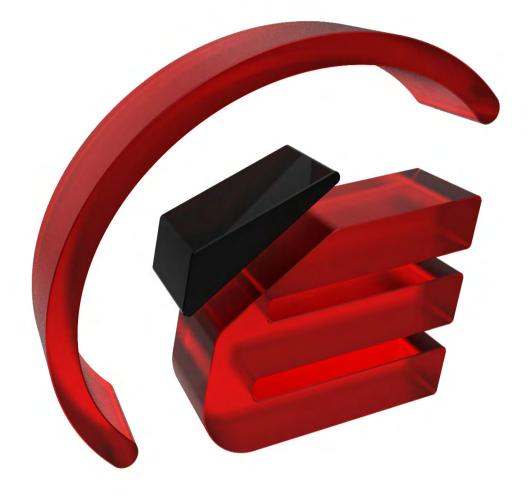
Ordering Information

Product Description	Order No.
3-Port, 48 V d.c, 1/8 Inch BSP, North America	H06200130
3-Port, 24 V a.c, 50/60 Hz, 1/8 Inch BSP	H06200125
3-Port, 24 d.c, 1/8 Inch BSP	H06200124
3-Port, 110 V a.c, 50/60 Hz, 1/8 Inch BSP	H06200126
3-Port, 230 V a.c, 50/60 Hz, 1/8 Inch BSP	H06200138
5-Port lw, 24 V a.c, 50/60 Hz, 6mm BSP	B28703030
5-Port lw, 24 V d.c, 6mm BSP	B28703055
5-Port, 110 V a.c, 50/60 Hz, ¼" BSP	H06200136
5-Port, 230 V a.c, 50/60 Hz, ¼" BSP	H06200137
5-Port lw, 110 V a.c, 50/60 Hz, 6mm BSP	B28703031

Technical Data

Valve Valve Type		Recommend Control Valve Configuration	Schematic
GV gate valves	Double-acting cylinder with no spring return	1 x 5-port lw	3
PVPK pipeline valves soft start QSB 250P	Single-acting cylinder with spring return	1 x 3-port	1
BRV backing/roughi ng valve	Double-acting cylinder with spring return to the mid- position (that is, isolated position)	2 x 5-port lw or (1 x 5-port lw)	2*(4†)
QSB63/100/16 0 quarter swing butterfly valves, Diffstak isolation-valves	Double-acting cylinder with no spring return	1 x 5-port	4
Supply pressure	3-port	5-port lw	5-port
bar gauge	2.1 - 8	3.4 - 4.8	2.4 - 7

^{*} This configuration allows the use of the isolated position of the vacuum valve.
† This configuration only allows the use of the roughing and backing positions of the vacuum valve.



Fittings and Flanges







6

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- · Fast availability from responsive local supply centers
- · Edwards worldwide support
- International ISO, Pneurop and British Standards
- Complete range for all common sizes in aluminum and stainless steel
- Stainless fittings made in 316L for highest corrosion resistance
- Precision material control ensures low outgassing and dependable vacuum performance

When you buy flange fittings from Edwards, you can expect the service that only a leading international supplier can offer you. Whether you are an OEM (needing scheduled deliveries of component kits for series production) or a unique system builder, you can rely on your local supplier to meet all your requirements.

70 Years of Vacuum Experience

From our experience in vacuum technology we enjoy solving your vacuum problems. You can rely on our library of vacuum applications and let us advise you on the most cost effective solutions. Our trained engineers will resolve any problem you have in choosing the right product for your application or troubleshooting a product that's not doing what you expected.

Partnership with Edwards

Edwards offers complete vacuum solutions. With our wide range of pumping technologies and sophisticated distribution networks we can offer flexible supply partnerships to match your competitive needs and offer the best value for your budget.

The Edwards Advantage

One Source Shopping

- · Simplifies administration and purchasing costs
- Creates more purchasing power
- Ensures total quality performance

Kitting

- · All components supplied for system build in one kit
- · Simplifies ordering
- · Ensures no missing parts in production
- Easier administration
- · Reduces inventory levels, stock costs and warehousing space
- · Easier control of usage

Consignment Stocks

- · Only pay for when used
- · Stocks on your premises
- No delivery problems
- · Stocks regularly replenished when used

Total Quality

- · Accredited ISO9001 supplier
- Customer contracts performance measures

Vacuum Fittings in General

Edwards vacuum fittings are designed to be leak-tight in vacuum applications. However, they are not intended to provide full structural support. When designing vacuum systems, it is essential that consideration be given to the static and dynamic loads imposed on each connection. If necessary, additional mechanical support should be provided.

Regular inspection including leak-checking and, where appropriate, periodic replacement of components should be considered.

These accessories are primarily designed for vacuum applications however some will withstand a small over-pressure, which is indicated in the tables below where appropriate. For the purpose of the European Union's Pressure Equipment Directive (97/23/EC), these items are considered to be piping for Group 2 gases (i.e. gas mixtures which are not explosive, flammable, toxic or oxidising) and are manufactured according to sound engineering practice as defined within the Directive.

NW and ISO Flange Fittings

Choose the optimum material to match your application and budget. Aluminum is ideal for achieving dependable cost-effective performance down to 10⁻⁷ mbar. Edwards also offers 316L/DIN 1.4404 stainless steel fittings for rugged corrosion resistance in semiconductor processing and excellent repeatability in high vacuum applications. In addition, careful quality control of elastomer specifications ensures critical sealing materials deliver the low outgassing performance your vacuum system performance depends on. Edwards attention to detail on all specifications delivers fit-and-forget dependability for your vacuum equipment.

UHV ConFlat® Flange Fittings

Sealing Principle A copper seal is squeezed axially and radially between two CF flanges, where knife-edges force the copper to cold flow. This flow is severely limited by the vertical flange wall which generates high pressures and fills surface imperfections to give a leak tight joint. At high bakeout temperatures, the flange geometry maintains high internal pressures despite softening of the gasket. A radial groove extends right up to the sealing ring and provides for leak testing of the vacuum connection.

Materials Our range of CF flanges is manufactured from AISI 304 stainless steel, which offers optimum performance at an affordable cost. Stainless steel 304 is used for the majority of UHV applications where a bakeout temperature of up to 450 °C is needed. AISI 316LN stainless steel is recommended for special applications where a harder material, higher bakeout temperature and much lower magnetic permeability are needed: these fittings are available on special order terms.

Dimensions Edwards CF flanges are manufactured to international standards and are compatible with all leading manufacturers. Metric flanges common in Europe and Asia use metric tapped holes and bored holes in flanges suitable for metric tubing. Flanges specified in inches, more commonly used in the USA, use UNF tapped flange threads and bored holes compatible with inch sized tube. Edwards offers both options.

CF Flange Names There are many descriptions used to describe the same flange sizes. Use the table below to cross-reference between common names.

					Flange	OD
CF Flange Name Equivalents						inch
DN16CF	NW16	CF34	NW16CF	1⅓ inch	34.00	1.33
DN25CF			NW25CF	21/4 inch	53.60	2.11
DN40CF	NW35	CF70	NW35CF	2 ¾ inch	70.00	2.73
DN50CF			NW50CF	3 % inch	85.70	3.37
DN63CF	NW63	CF114	NW63CF	4½ inch	114.00	4.47
DN80CF			NW75CF	4% inch	117.35	4.62
DN100CF	NW100	CF150	NW100CF	6 inch	152.00	5.97
DN125CF			NW130CF	6 ¾ inch	171.45	6.75
DN160CF	NW150	CF200	NW150CF	8 inch	202.00	7.97
DN200CF	NW200	CF250	NW200CF	10 inch	253.00	9.97
DN250CF	NW250	CF300	NW250CF	12 inch	306.00	13.25

NW Polymer Clamping Rings



In addition to the traditional aluminum hinged clamp, Edwards also offers a range of coupling clamps manufactured from high technology polymer, offering important advantages for the vacuum system builder

Compared to aluminum, the high flexural modulus and better strength-to-weight ratio has enabled Edwards to design and manufacture clamps which are lighter and more compact than existing aluminum products. The CX4 crystalline aryl polymer clamps can be used at temperatures up to 100 °C and are unaffected by most common solvents.

These clamps are competitively priced and the high quality finish will enhance the appearance of any vacuum system. The range is available in swing and quick release hinged versions covering the following flange sizes: NW10/16, 20/25, 25/32, 32/40 and 50. With Edwards Co-Seals, swing clamps are suitable for use in the pressure range 10⁻⁷ mbar to 10 bar. Electrical continuity across the clamps is achieved by built-in earth strips.

Co-Seal

The introduction of our Co-Seal represented a major advance in the method of sealing NW and ISO flange connections. Discerning users appreciate the benefits of a seal design which eliminates crevices and trapped volumes. Our NW Co-Seals with polymer carriers offer a more economical seal with even wider appeal.

A Co-Seal has a split outer ring, or carrier, which retains a moulded elastomer sealing ring. When fitted, the inner face of the Co-Seal is directly exposed to the vacuum system, eliminating any crevices or trapped volumes which can generate gas bursts and inhibit pumpdown. Unlike the regular centering ring and O-ring, the NW Co-Seal is fully restrained externally and is therefore suitable from 10⁻⁷ mbar to 10 bar. Available with either nitrile or fluoroelastomer seals.

For ISO bolted flanges, cut-outs around the external circumference of the Co-Seal are positioned so that the securing bolts centralize the Co-Seal precisely. For ISO collar flanges, claw clamps also centralize the seal and are themselves spaced around the flange by the cut-outs in the Co-Seal.

Centering Rings in High Technology Polymer

We complement our aluminum centering rings with a range manufactured from a high-tech polymer. These centering rings have a unique slotted design which prevents gas bursts. The CX2 polymer can be used at temperatures up to 100 °C and is unaffected by most common solvents. The material has an outgassing rate of 6.6×10^{-8} mbar I s $^{-1} \text{cm}^{-2}$ which makes it suitable for use in most vacuum systems, whilst giving additional benefits in terms of lower weight and cost.

Technical Data

Physical Data

O	perating pressure range (absolute)	
	C clamp and centering ring	10 ⁻⁷ mbar – 1 bar / 14.5 psi
	Stainless steel clamping ring and Co-Seal	10 ⁻⁷ mbar – 10 bar / 145 psi
	Stainless steel clamp and metal seal	10 ⁻⁸ mbar – 3 bar / 44 psi
	Stainless steel clamp and Co-Seal (all sizes)	10 ⁻⁷ mbar – 10 bar / 145 psi
Po	olymer and aluminum clamps and Co-Sea	I
	NW10 to NW25	10 ⁻⁷ mbar – 10 bar / 145 psi
	NW40 to NW50	10 ⁻⁷ mbar – 10 bar / 145 psi
N۱	W trapped O-ring	10 ⁻⁷ mbar – 10 bar / 145 psi
0-	ring and centering ring (vacuum use only	
Ве	ellows	10 ⁻⁷ mbar – 1 bar / 14.5 psi
FI	exible pipelines*	10 ⁻⁷ mbar – 1.5 bar / 21 psi
Br	raided flexible pipelines*	10 ⁻⁷ mbar – 10 bar / 145 psi

* Depends on size

Operating Temperature

Polymer Co-Seal

The maximum temperature for continuous operation with fluoroelastomer is 150 °C. It may be intermittently baked to 200 °C.

Aluminum Co-Seal and nitrile seal	-10 to 100 °C
Aluminum Co-Seal and fluoroelastomer seal	-10 to 200 °C
Polymer centering ring and nitrile O-ring	-10 to 100 °C
Polymer centering ring and fluoroelastomer seal	-10 to 125 °C
Nitrile O-ring	-10 to 100 °C
Fluoroelastomer O-ring	-10 to 200 °C
Polymer clamp	
Constant vacuum use	-10 to 100 °C
Intermittent vacuum use	-10 to 125 °C
Stainless steel clamping ring	-10 to 125 °C
Aluminum clamping ring	-10 to 200 °C
Stainless steel clamp	-10 to 200 °C

Standards compliance NW and ISO fittings

Pneurop 6606 (1981), ISO1609 (1986) DIN28403, DIN28404

-10 to 80 °C

CF fittings ISO3669

Stainless steel equivalents

AISI Number	German Steel Number	DIN Standard
304	1.4301	X5 CrNi 18 10
303	1.4305	X10 CrNi 5 18 9
304L	1.4306	X2 CrNi 19 10
301	1.4310	X12 CrNi 17 7
316	1.4401	X5 CrNiMo 18 10
316L	1.4404	X2 CrNiMo 17 13 2
316Ti	1.4571	X6 CrNiMoTi 17 12 2
321	1.4541	X10 CrNiTi 18 9

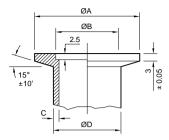
Chemical Resistance

This information is provided as a general guide only. Further guidance should be sought with respect to specific chemicals and their applications

their applications			
	Material Nitrile	Generally Resistant To	Generally Attacked By
	Butadiene Acrylonitrile copolymer	Many hydrocarbons fats, oils greases, hydraulic fluids	Ozone, ketones, esters, aldehydes, chlorinated and nitro hydrocarbons
ı		Moderate chemicals	Ctrong ovidining opido
	Chloroprene polymer	and acids, ozone, oily fats, greases, many oils and solvents	Strong oxidizing acids and esters, ketones, chlori-nated aromatic and nitro hydrocarbons
	Fluoroelastomer		
	Fluorocarbon polymer	All aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable fats	Ketones, low molecular weight esters and nitro containing compounds
	Aluminum		
		Organic acids, fatty acids, freons, nitric acid	Strong acids, alkalis chlorinated solvents, mercury
	Stainless steel		
		Organic acids, alkalis, nitric acid. Sulphuric acid (10%)	Oxidizing chlorines, some organic acids, hydrochloric acid, hydrofluoric acid
	Polymer		
	Liquid crystal polymer	Organic acids, glycols, chlorinated solvents, ketones, mineral and oxidising acids, caustic solutions freons	Sodium hydroxide, sulphuric acid (70%)

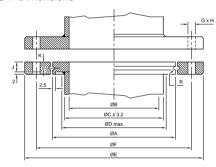
Dimensions

NW Dimensions



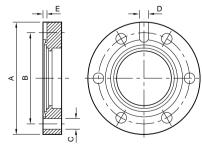
	Α	В	С	D
NW10	30	12.2	2	14
NW16	30	17.2	2	20
NW20	40	22.2	2	25
NW25	40	26.2	2	28
NW32	55	34.2	2	38
NW40	55	41.2	2	44.5
NW50	75	52.2	2	57

ISO-K, ISO-F Dimensions



	Α	В	С	D	Ε	F	G	Н	J	K	R
ISO63	95	70	76.1	80	130	110	9	4	10	5	1.5
ISO80	110	83	88.9	95	145	125	9	8	10	5	1.5
ISO100	130	102	114.3	115	165	145	9	8	10	5	1.5
ISO160	180	153	160.3	165	225	200	11	8	10	5	2.5
ISO200	240	213	219	225	285	260	11	12	10	5	2.5
ISO250	290	261	273	275	335	310	11	12	10	5	2.5
ISO320	370	318	324	355	425	395	14	12	15	7.5	2.5
ISO400	450	400	406	435	510	480	14	16	15	7.5	4
ISO500	550	501	508	535	610	580	14	16	15	7.5	4
ISO630	690	630	660	660	750	720	14	20	20	10	5

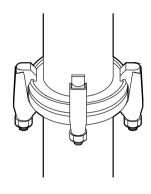
CF dimensions



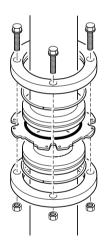
Nominal	A, mm	A, inch	В	С	D	E	Bolt Holes
DN16CF	34	1⅓	27	4.4	-	_	6
DN40CF	70	2 3/4	58.7	6.6	_	_	6
DN63CF	114	41/2	92.1	8.4	6	3	8
DN100CF	152	6	130.2	8.4	6	3	16
DN160CF	202	8	181	8.4	6	3	20
DN200CF	253	10	231.8	8.4	6	3	24
DN250CF	306	12	284	8.4	6	3	32

ISO Flange Assembly with Co-Seals

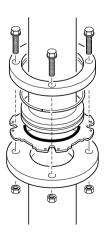
Two Fixed Collar Flanges with Claw Clamps



Two Rotatable Flanges



One Fixed Collar Flange, with One Rotatable Flange





Clamping Ring Polymer Clamp Neat appearance Rugged Pneurop standard Aluminum Clamp 6-7 Competitive price Metal Clamp Suitable for aluminum and indium seals 6-7 Wide temperature range Claw Clamps and Bolts Wide range optimized for many applications 6-19 6-32 High strength CF bolts for UHV flanges



Description

Clamps

-	1	✓	1	Low cost Gas vents – no gas bursts Resistant to solvents	6-8	-	_
✓	/	1	1	No gas bursts	6-10	6-20	_
-	1	1	✓	No gas bursts Suitable for up to 10 bar	6-9	6-20	-
✓	1	1	√	Stainless steel and aluminum carrier Pneurop standard Fluoroelastomer and nitrile versions	6-8	6-21	_
-	1	1	_	Aluminum all metal seals Copper gaskets for UHV seals	6-9	_	6-31
	✓ -	✓ ✓ - ✓	✓ ✓ ✓ - ✓ ✓	- V V V	Gas vents – no gas bursts Resistant to solvents V V V No gas bursts No gas bursts Suitable for up to 10 bar V V V Stainless steel and aluminum carrier Pneurop standard Fluoroelastomer and nitrile versions - V V - Aluminum all metal seals	Gas vents – no gas bursts Resistant to solvents V V V No gas bursts 6-10 V V V No gas bursts 6-9 Suitable for up to 10 bar V V V Stainless steel and aluminum carrier Pneurop standard Fluoroelastomer and nitrile versions V V V A Aluminum all metal seals 6-9	Gas vents – no gas bursts Resistant to solvents V V V No gas bursts 6-10 6-20 - V V V No gas bursts 6-9 6-20 Suitable for up to 10 bar V V V Stainless steel and aluminum carrier Pneurop standard Fluoroelastomer and nitrile versions - V V - Aluminum all metal seals 6-9 -



Pipeline Components

r ipcline components								
Aluminum	-	1	1	1	NW10 to NW50 components	6-10	6-22	-
Stainless Steel	✓	1	1	1	NW10 to NW50 components NW and ISO fittings in 316L for corrosion resistance CF fittings in 304L for cost effectiveness	6-10	6-22	6-28

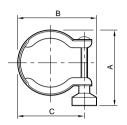


Bellows and Flexible Pipelines

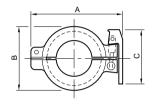
Bellows	✓	✓	1	✓	NW and ISO fittings in 316L, CF fittings in 304L Suitable for minimizing transfer of vibration from pump to vacuum systems	6-17	6-25	6-31
Flexible Pipelines	_	✓	1	✓	Use to simplify connection of two components or correct misalignment Use braided versions for positive pressure applications (like dry pump exhausts)	6-17	6-25	_

C10517304

NW fittings

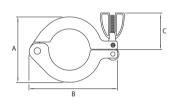


Size	Α	В	С	D	E	F	Ordering Number
Clamping Ring							
Stainless steel							
NW10/16	44	46	34				C10512401
NW20/25	60	60	48				C10514401
NW32/40	73	75	63				C10516401
NW50	90	96	84				C10517401



Hinged Clamp

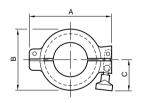
Aluminum				
NW10/16	68	40	57	C10512402
NW20/25	80	50	57	C10514402
NW32/40	95	66	57	C10516402
Polymer				
NW10/16	68	40	57	C10512303
NW20/25	80	50	57	C10514303
NW32/40	95	66	57	C10516303
NW50	125	86	57	C10517303



Swing Clamp

Aluminum				
NW10/16	62	40	35	C10512403
NW20/25	75	50	35	C10514403
NW32/40	90	66	35	C10516403
NW50	120	86	35	C10517403
Polymer				
NW10/16	62	40	35	C10512304
NW20/25	75	50	35	C10514304
NW32/40	90	66	35	C10516304

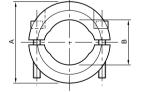
35



Clamp	/N/otal	Coole
Ciamb	uvietai	Seals

NW50

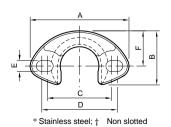
Stainless steel			
NW10/16	54	22	C10512404
NW20/25	64	32	C10514404
NW32/40	82	47	C10516404
NW50	112	62	C10517404



We recommend the use of thread lubricant, 1764 00030.

120

86

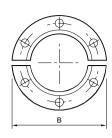


"C" Clamp Nickel plated brass including screw pack

Mickel plated blass inc	lading solew paci	`					
NW10/16	59	35	38	45	6.3	22	C11002340
NW25	70	44	54	54 [†]	8.3	25.4	C11004340
NW40*	100	73.5	79	81	8.3	50	C11005340

6

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Bulkhead Clamp						
Aluminum					Europe	N. America
NW10/16	9.2	50.8	38.1	5.1	C10512007	C90512007
NW25	9.8	60.3	48.0	5.1	C10514007	C90514007
NW40	9.3	74.6	62.0	5.1	C10516007	C90516007
NW50	10.3	95.2	83.0	5.1	C10517007	C90517007

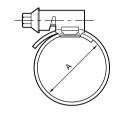
Ε

С

Size

All sizes supplied with 6 x 10-32 UNF x 5/8" hex head stainless steel bolts 6 x 10-32 UNF stainless steel plain washers

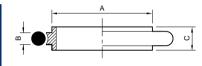
Α



PVC Hose Clamp

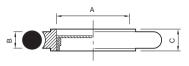
~ .		
Stain	1200	STAR

NW10/16	25	C10512408
NW25	36	C10514408
NW40	50	C10516408
NW50	60	C10517408



Centering Ring with O-Ring

Fluoroelastomer/stainless	steel carrier			
NW10	12	3.9	8	C10511395
NW16	17	3.9	8	C10512395
NW25	26	3.9	8	C10514395
NW40	41	3.9	8	C10516395
NW50	52	3.9	8	C10517395
Fluoroelastomer/aluminur	n carrier			
NW10	12	3.9	8	C10511397
NW16	17	3.9	8	C10512397
NW25	26	3.9	8	C10514397
NW40	41	3.9	8	C10516397
Fluoroelastomer/polymer	carrier			
NW10	12	3.9	8	C10511394
NW16	17	3.9	8	C10512394
NW25	26	3.9	8	C10514394
NW40	41	3.9	8	C10516394
Nitrile/stainless steel carri	ier			
NW10	12	3.9	8	C10511396
NW16	17	3.9	8	C10512396
NW25	26	3.9	8	C10514396
NW40	41	3.9	8	C10516396
NW50	52	3.9	8	C10517396
Nitrile/aluminum carrier				
NW10	12	3.9	8	C10511398
NW16	17	3.9	8	C10512398
NW25	26	3.9	8	C10514398
NW40	41	3.9	8	C10516398
Nitrile/polymer carrier				
NW10	12	3.9	8	C10511393
NW16	17	3.9	8	C10512393
NW25	26	3.9	8	C10514393
NW40	41	3.9	8	C10516393



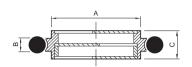
Centering Ring with Screen

Size

Fluoroelastomer/stainless steel AISI 316L DIN 1.4404 Stainless Steel wire Ø0.5 Aperture size 1 mm²

С

i idorociastomer/stamicss steer/	NOI O I O L	DII 1.77	104 Otalilicos Oteci Wile 20.0 Apertare 3120 i min	
NW16	9.5	3.9	8	C10512085
NW25	19.5	3.9	8	C10514085
NW40	32	3.9	8	C10516085
NW50	43	3.9	8	C10517085



Centering Ring with Optical Baffle

Fluoroelastomer/stainless steel AISI 304L DIN 1.4301

NW25 26	6	3.9	8.5	D02110000
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NW10	D02158020
NW25	NGW288000
NW40	D15405110



Co-Seal

Nitrile/aluminum carrier

	NW10/16	32	3.9	7	B27158480
_	NW20/25	42	3.9	7	B27158490
	NW32/40	57	3.9	7	B27158500

Nitrile/po	lymer	carrier
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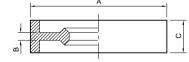
NW10/16	32	3.9	7	B27158426
NW20/25	42	3.9	7	B27158447
NW32/40	57	3.9	7	B27158454
NW50	77.5	3.9	7	B27158467

Fluoroelastomer/aluminum carrier

NW10/16	32	3.9	7	B2/158481
NW20/25	42	3.9	7	B27158491
NW32/40	57	3.9	7	B27158501

Fluoroelastomer/polymer carrier

NW10/16	32	3.9	7	B27158427
NW20/25	42	3.9	7	B27158448
NW32/40	57	3.9	7	B27158453
NW50	77.5	3.9	7	B27158466



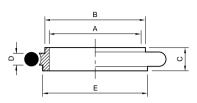
Metal Seals

Aluminum Use with clamps (metal seals) C105-XX-404.

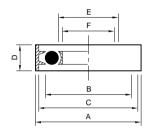
NW10/16	32	2.0	7	C27159004
NW20/25	42	2.0	7	C27159005
NW32/40	57	2.0	7	C27159006
NW50	77	2.0	7	C27159007

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6



Size	Α	В	С	D	E	F	Ordering Number
Adapting Centering Ring w	ith O-Rii	ng					
Nitrile NW10/16 stainless steel	10	12	8	3.9	17		C10512346
NW10/16 polymer	10	12	8	3.9	17		C10512349
Fluoroelastomer							
NW10/16 stainless steel	10	12	8	3.9	17		C10512345
NW10/16 polymer	10	12	8	3.9	17		C10512350



NW Trapped O-Ring							
Fluoroelastomer/stainless stee	el/aluminu	m					
NW10/16	32.5	27.5	30.2	7	18.5	16	C10512490
NW25	42.5	37.5	40.2	7	28.5	25	C10514490
NW40	57.5	52.0	55.2	7	43	40	C10516490
NW50	77.5	64.5	75.2	7	55.5	50	C10517490



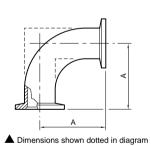
O-Ring (Pack of 10)

Nitrile			
NW10	15	5	H02124012
NW16	18	5	H02124013
NW25	28	5	H02124015
NW40	42	5	H02124017
NW50	50	5	H02124018



O-Ring (Pack of 5)

Fluoroelastomer			
NW10	15	5	H02124032
NW16	18	5	H02124033
NW25	28	5	H02124035
NW40	42	5	H02124037
NW50	50	5	H02124038



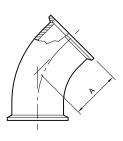
Aluminum BS LM25 DIN 3.2371▲

Elbow 90°

NW10	30	C10511410
NW16	40	C10512410
NW25	50	C10514410
NW40	65	C10516410
Stainless Steel AIS	I 316L DIN 1.4404	
NIMA	20	C10E11420

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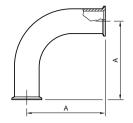
Stainless Steel AlSi	316L DIN 1.4404	
NW10	30	C10511420
NW16	40	C10512420
NW25	50	C10514420
NW40	65	C10516420
NW50	70	C10517420



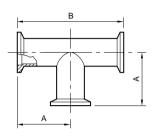
Elbow 45°

Stainless Steel AISI	316L DIN 1.4404	
NW16	23.2	C10512405
NW25	28.5	C10514405
NW40	42.7	C10516405
NW50	50.6	C10517405

Size	Α	В	С	D	E	F	Ordering Number
Long Radius Elbow							

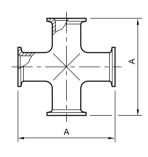


NW50	140	C10517406
NW40	130	C10516406
Stainless Steel AISI 31	6L DIN 1.4404	
Long Radius Elbow		



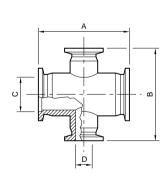
T-Piece

Aluminum BS LM25	DIN 3.2371		
NW10	30	60	C10511411
NW16	40	80	C10512411
NW25	50	100	C10514411
NW40	65	130	C10516411
Stainless Steel AISI	316L DIN 1.4404		
	316L DIN 1.4404 30	60	C10511421
NW10		60 80	C10511421 C10512421
NW10 NW16	30		
NW10 NW16 NW25 NW40	30 40	80	C10512421



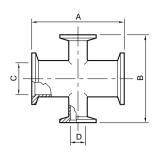
Cross Piece

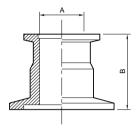
Aluminum BS LM25	DIN 3.2371	
NW10	60	C10511412
NW16	80	C10512412
NW25	100	C10514412
NW40	130	C10516412
Stainless Steel AIS		C10511422
Stainless Steel AIS NW10	316L DIN 1.4404	
Stainless Steel AIS NW10 NW16	316L DIN 1.4404 60	C10511422
Stainless Steel AIS NW10 NW16 NW25 NW40	316L DIN 1.4404 60 80	C10511422 C10512422

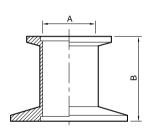


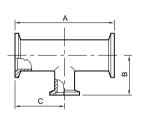
Reducing Cross

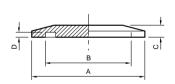
Aluminum ISO 6082 DIN 3.2315					
NW25/10	70	70	26.2	12.2	C10514413
NW40/10	80	90	41.2	12.2	C10516413











Α	В	С	D	E	F	Ordering Number
DIN 1.4404						
70	70	26.2	12.2			C10514423
100	80	26.2	17.2			C10514424
130	80	41.2	17.2			C10516424
130	100	41.2	26.2			C10516425
140	100	52.2	26.2			C10517425
	DIN 1.4404 70 100 130	DIN 1.4404 70 70 100 80 130 80 130 100	DIN 1.4404 70 70 26.2 100 80 26.2 130 80 41.2 130 100 41.2	DIN 1.4404 70 70 26.2 12.2 100 80 26.2 17.2 130 80 41.2 17.2 130 100 41.2 26.2	DIN 1.4404 70 70 26.2 12.2 100 80 26.2 17.2 130 80 41.2 17.2 130 100 41.2 26.2	DIN 1.4404 70 70 26.2 12.2 100 80 26.2 17.2 130 80 41.2 17.2 130 100 41.2 26.2

Reducing Piece

	100		DIA 1	0 004	_
Aluminum	ISO	6082	DIN	3.231	5

NW25/10	10	40	C10514436
NW25/16	16	40	C10514437
NW40/25	24	40	C10516439
NW40/16	16	40	C10516438
NW50/16	16	40	C10517040
NW50/25	24	40	C10517043
NW50/40	41	40	C10517041

Reducing Piece

Stainless Steel AISI 316L DIN 1.4404

NW25/10	10	40	C10514446
NW25/16	16	28	C10514447
NW40/16	16	28	C10516448
NW40/25	24	28	C10516449
NW50/16	16	28	C10517450
NW50/25	24	40	C10517051
NW50/40	40	28	C10517452

Reducing T-Piece

Stainless Steel AISI 316L DIN 1.4404

Stairliess Steel Alor 5	IOL DIN 1.4404			
NW25/16	100	40	50	C10514427
NW40/16	130	40	65	C10516428
NW40/25	130	50	65	C10516429
NW50/16	140	50	70	C10517430
NW50/25	140	65	70	C10517431

Blanking Flange

Aluminum BS LM 25 DIN 3.2371

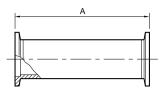
NW10	30	12.2	6	2.5	C10511368
NW16	30	17.2	6	2.5	C10512368
NW25	40	26.2	6	2.5	C10514368
NW40	55	41.2	6	2.5	C10516368

Stainless Steel AISI 316L DIN 1.4404

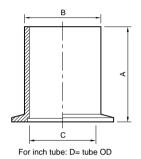
Otali 11000 Otool 7 1101 O 1	OL DII 1.1101				
NW10	30	12.2	6	2.5	C10511366
NW16	30	17.2	6	2.5	C10512366
NW25	40	26.2	6	2.5	C10514366
NW40	55	41.2	6	2.5	C10516366
NW50	75	52.2	6	2.5	C10517366

C10504102

C10504103



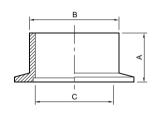
Size	Α	В	С	D	E	F	Ordering Number
Full Nipple							
Aluminum BS LM 25	DIN 3.2371						
NW10	60						C10511409
NW16	80						C10512409
NW25	100						C10514409
NW40	130						C10516409
Stainless Steel AISI	316L DIN 1.4404						
NW10	60						C10511433
NW16	80						C10512433
NW25	100						C10514433
NW40	130						C10516433
NW50	140						C10517433
Long Flange Weld	Stub						



Stainless Steel AISI 316L DIN 1.4404

For metric tube				
NW10	70	15	10	C10511316
NW16	70	20	16	C10512316
NW25	70	28	24	C10514316
NW40	70	44.5	41	C10516616
NW50	70	57	51	C10517316

For inch tube					
NW10	40	12.7	9.3	1/2	C10504080
NW16	40	19.1	15.7	3/4	C10504101
NW25	40	25.4	22	1	C10504223
NW40	40	38.1	34.7	1½	C10504324
NW50	40	50.8	47.4	2	C10504351
-					



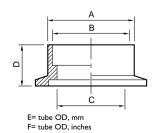
For inch tube: D= tube OD

Short Flange Weld Stub

Stainless Steel AISI 316L DIN 1.4404

For metric tube

NW10	30	15	10		C10511311
NW16	30	20	16		C10512311
NW25	30	28	24		C10514311
NW40	30	44.5	41		C10516611
NW50	30	57	51		C10517311
For inch tube					
NW10	12.7	12.7	9.3	1/2	C10504079
NW16	12.7	19.1	15.7	3/4	C10504100
NW25	12.7	25.4	22	1	C10504222
NW40	19.1	38.1	34.7	1½	C10504323
NW50	19.1	50.8	47.4	2	C10504350



Weld Socket Flange for Inch Tube

 Stainless Steel AISI 316L DIN 1.4404

 NW16
 15.5
 13
 11.4
 12.7

 NW16
 22.1
 19.3
 17.3
 12.7

 NW25
 28.6
 25.9
 22.1
 12.7

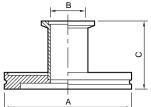
C10504224 25.4 1 C10504325 NW40 44.5 38.6 34.9 12.7 38.1 1½ NW50 C10504353 57.2 51.3 47.5 12.7 50.8 2

12.7

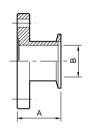
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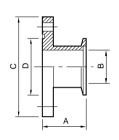
1/2

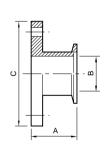
3/4

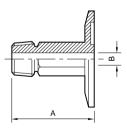


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Size	Α	В	С	D	E	F	Ordering Number
Adaptor NW/ISO							
Stainless Steel AISI 316L D	IN 1.4404						
NW25/ISO63	95	25	50				C10007115
NW40/ISO63	95	40	50				C10007116
NW40/ISO80	110	40	118				C10008002
NW40/ISO100	130	40	50				C10009122
NW50/ISO63	95	50	50				C10007118
NW50/ISO80	110	50	118				C10008003
NW50/ISO100	130	50	50				C10009123
Adaptor NW/CF Stainless Steel AISI 316L D NW16/DN16CF/11/3	IN 1.4404 52.7	15.8					C10503104
NW16/DN40CF/23/4	45.3	15.8					C10503105 C10503207
NW25/DN40CF/2 ³ / ₄ NW40/DN40CF/2 ³ / ₄	45.3	22 40					C10503207
NW50/DN63CF/4½	45.3 49.5	50					C10503305
INVVOU/DINO3CF/4/2	49.5	50					C10503405
Adaptor NW/ASA with O	-Ring Groo	ove					
Stainless Steel AISI 316L D							
NW40/2 inch ASA	46	40	152	86.9			C10503310
NW40/3 inch ASA	46	40	190	118			C10503311

Adaptor NW/ASA without O-Ring Groove

46

50

152

86.9

Stainless Steel AISI 316L DIN 1.4404

NW50/2 inch ASA

NW40/11/2 inch ASA	46	40	127	C10503303
NW40/2 inch ASA	46	40	152	C10503300
NW50/2 inch ASA	46	50	152	C10503400

C10503410

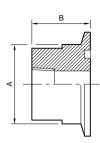
Adaptor NW/NPT Threaded Pipe Male

Stainless Steel AISI 316L DIN 1.4404

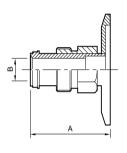
Stainless Steel AISI 316L DIN	1.4404		
NW16/1/4 inch NPT male	40	4.7	C10501102
NW16/1/4 inch NPT male	50	7.1	C10501103
NW25/1/4 inch NPT male	40	4.7	C10501217
NW25/1/4 inch NPT male	50	7.1	C10501218
NW25/½ inch NPT male	75	11.9	C10501219
NW25/¾ inch NPT male	75	15.9	C10501220
NW40/1/4 inch NPT male	50	7.1	C10501303
NW40/½ inch NPT male	75	11.9	C10501304
NW40/¾ inch NPT male	75	15.9	C10501305
NW40/1 inch NPT male	75	22.2	C10501306
NW50/½ inch NPT male	75	11.9	C10501501
NW50/1 inch NPT male	75	22.2	C10501503

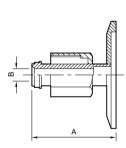
C10501312

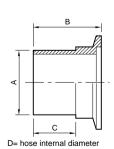
C10501314



Size	Α	В	С	D	E	F	Ordering Number
Adaptor NW/NPT Threaded	d Pipe F	emale					
Aluminum ISO 6082 DIN 3.231	5						
NW10/1/8 inch NPT female	15.8	19.1					C10501070
NW16/1/8 inch NPT female	15.8	19.1					C10501104
NW25/1/8 inch NPT female	22.4	19.1					C10501221
NW40/1/8 inch NPT female	31.8	25.4					C10501307
NW10/1/4 inch NPT female	15.8	19.1					C10501071
NW16/1/4 inch NPT female	15.8	19.1					C10501105
NW25/1/4 inch NPT female	22.4	19.1					C10501222
NW40/1/4 inch NPT female	31.8	25.4					C10501308
Stainless Steel AISI 316L DIN	1.4404						
NW10/1/2 inch NPT female	15.8	19.1					C10501072
NW16/1/2 inch NPT female	15.8	19.1					C10501106
NW25/1/2 inch NPT female	22.4	19.1					C10501223
NW40/1/2 inch NPT female	31.8	25.4					C10501309
NW10/1/4 inch NPT female	15.8	19.1					C10501073
NW16/1/4 inch NPT female	15.8	19.1					C10501107
NW25/1/4 inch NPT female	22.4	19.1					C10501224
NW40/1/4 inch NPT female	31.8	25.4					C10501310
Adaptor NW/VCR Male							
Stainless Steel AISI 316L DIN	1.4404						
NW16/1/, inch VCP male	35.6	/ R					C10501108







NW16/1/4 inch VCR male	35.6	4.8	C10501108
NW16/½ inch VCR male	41.4	10.4	C10501110
NW25/1/4 inch VCR male	35.6	4.8	C10501225
NW25/½ inch VCR male	40.6	10.4	C10501227
NW40/1/4 inch VCR male	35.6	4.8	C10501311
NW40/½ inch VCR male	40.6	10.4	C10501313
NW50/1/4 inch VCR male	35.6	4.8	C10501508
Adaptor NW/VCR Female Stainless Steel AISI 316L DIN 1	1.4404		
NW16/1/4 inch VCR female	35.6	4.8	C10501109
	33.0	4.0	
NW16/½ inch VCR female	41.4	10.4	C10501111
NW25/1/4 inch VCR female	35.6	4.8	C10501226
NW25/½ inch VCR female	40.6	10.4	C10501228
NW25/½ inch VCR female NW25/¾ inch VCR female	40.6 54.4	10.4 15.7	C10501228 C10501230

Adaptor PVC Hose Stainless Steel AISI 316L DIN 1.4404 NW10/1/2 inch hose C10504081 20 12.7 12.7 32 NW16/1/2 inch hose 12.7 32 20 12.7 C10504104 NW16/3/4 inch hose 19.1 32 20 19.1 C10504105 25.4 C10504225 NW25/1 inch hose 25.4 38.1 26 NW40/1½ inch hose 38.1 50 38.1 38.1 C10504326 NW50/2 inch hose 47.4 55 C10504352 50.8

35.6

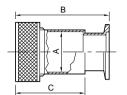
40.6

4.8

10.4

NW40/1/4 inch VCR female

NW40/1/2 inch VCR female



D= tube od in mm E= tube OD in inches

Size	Α	В	С	D	E	F	Ordering Number
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Gauge Tube Adaptor and Compression O-Ring

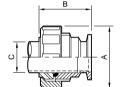
Stainless Steel AISI 316L DIN 1.4404 Fluoroelastomer O-ring

Claimicoo Cloor / HOT OT	OL DII 1.110111	aorooiac	0.0011101	11119		
NW10	13.1	50	33	12.7	1/2	C10502001
NW16	6.7	32	-	6.4	1/4	C10502101
NW16	13.1	50	33	12.7	1/2	C10502102
NW16	19.4	56	40	19.1	3/4	C10502103
NW25	13.1	50	33	12.7	1/2	C10502201
NW25	19.4	58	40	19.1	3/4	C10502202
NW25	25.8	62	46	25.4	1	C10502203
NW40	13.1	58	33	12.7	1/2	C10502300
NW40	19.4	63.5	40	19.1	3/4	C10502301
NW40	25.8	71	46	25.4	1	C10502302
NW40	29	74	49	28.6	l1⁄/8	C10502303
NW40	38.4	84	63.5	38.1	1½	C10502304
NW50	19.4	63.5	40	19.1	3/4	C10502400
NW50	25.8	71	46	25.4	1	C10502401
NW50	51.1	87	66	50.8	2	C10502404

Compression Fitting

Aluminum

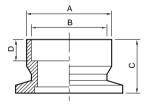
NW10	44	43	14/15	C10520050



Nozzle

Aluminum ISO 6082 DIN 3.2315

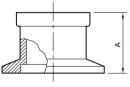
NW10	7	12	40	C10511645
NW25	7	12	40	C10514645
NW40	7	12	40	C10516645



Coupling Body

Brass

NW10	18	15.2	13	6	C10511328
NW25	32	28.2	20	8	C10514328
NW40	46	42.2	18	8	C10516628



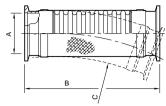
Temperature range -40 to 380 °C Temperature gradient <3 °C min⁻1

NW Optical Viewpoint

Body: Stainless Steel AISI 316L DIN 1.4404; Mounting: Nilo K; Glass: Borosilicate (8250 Schott)

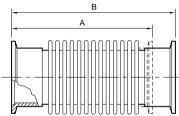
NW40	23.6	C10516407
NW50	31.8	C10517407

C10511670



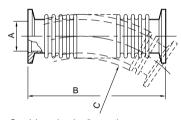
C= minimum bend radius, static
D= minimum bend radius, dynamic
E= maximum operating pressure, bar absolute

Size	Α	В	С	D	Е	F	Ordering Number
Braided Flexible Exha	aust Pipeline						
Stainless Steel AISI 316	L DIN 1.4404						
NW25	26.2	135	50	320	10.0		C10514294
NW40	41.2	135	80	400	10.0		C10516294
NW50	52.2	135	100	450	10.0		C10517294
NW25	26.2	250	50	320	10.0		C10514295
NW40	41.2	250	80	400	10.0		C10516295
NW50	52.2	250	100	450	10.0		C10517295
NW25	26.2	500	50	320	10.0		C10514296
NW40	41.2	500	80	400	10.0		C10516296
NW50	52.2	500	100	450	10.0		C10517296
NW25	26.2	1000	50	320	10.0		C10514297
NW40	41.2	1000	80	400	10.0		C10516297
NW50	52.2	1000	100	450	10.0		C10517297
Flexible Bellows							



Stainless Steel AISI 316L DIN 1.4404 NW10 123 102 1.2

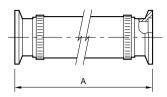
NW16	102	123	1.2	C10512670
_ NW25	102	123	1.2	C10514670
NW40	102	123	1.2	C10516670
NW50	102	123	1.2	C10517670



C= minimum bend radius, static
D= minimum bend radius, dynamic
E= maximum operating pressure, bar absolute

Flexible Pipelines

Stainless Steel AISI 31	16L DIN 1.4404					
NW10	12.2	250	30	100	1.5	C10511285
NW16	17.2	250	30	130	1.5	C10512285
NW25	26.2	250	50	210	1.5	C10514285
NW40	41.2	250	80	260	1.5	C10516285
NW50	52.2	250	100	320	1.5	C10517285
NW10	12.2	500	30	100	1.5	C10511286
NW16	17.2	500	30	130	1.5	C10512286
NW25	26.2	500	50	210	1.5	C10514286
NW40	41.2	500	80	260	1.5	C10516286
NW50	52.2	500	100	320	1.5	C10517286
NW10	12.2	750	30	100	1.5	C10511300
NW16	17.2	750	30	130	1.5	C10512300
NW25	26.2	750	50	210	1.5	C10514300
NW40	41.2	750	80	260	1.5	C10516300
NW50	52.2	750	100	320	1.5	C10517300
NW10	12.2	1000	30	100	1.5	C10511287
NW16	17.2	1000	30	130	1.5	C10512287
NW25	26.2	1000	50	210	1.5	C10514287
NW40	41.2	1000	80	260	1.5	C10516287
NW50	52.2	1000	100	320	1.5	C10517287



Size A B C D E F Ordering Num	nber
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Reinforced PVC Tube with NW Flanges and Hose Clamps

Stainless Steel AISI 316L DIN 1.4404

Ctall 11000 Ctool 7 110	10102 2111 111101	
NW10	500	C10511055
NW16	500	C10512055
NW25	500	C10514055
NW40	500	C10516055
NW50	500	C10517055
NW10	1000	C10511155
NW16	1000	C10512155
NW25	1000	C10514155
NW40	1000	C10516155
NW50	1000	C10517155

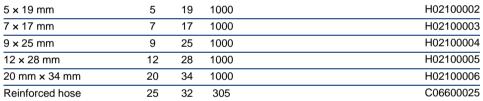
Maximum operating pressure 1 bar absolute, Temperature 5 to 60 °C

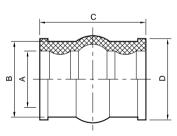


	Europe	N. America
1/2 inch ID tube	N/A	A63012220
¾ inch ID tube	H02100016	U30002173
1 inch ID tube	H02100017	A63012343
1½ inch ID tube	H02100018	U30000484
2 inch ID tube	H02100019	U30003837

Maximum operating pressure 1 bar absolute, Temperature 5 to 60 °C

Neoprene Rubber Tube

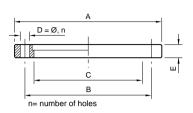




Moulded Sleeve					
Neoprene					
NW10	13	21	38	23	C26501002
NW25	27	36	55	38	C26501004

Ordering Number

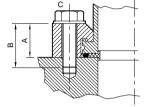
ISO fittings



Rotatable	Flange	with	Fitting	Kit

Mild steel nickel plated

willa steel flicker platea					
ISO63	130	110	95.5 Ø9, 4	12	C10007010
ISO80	145	125	110 Ø9, 8	12	C10008012
ISO100	165	145	130.5 Ø9, 8	12	C10009010
ISO160	225	200	180.7 Ø11,8	16	C10011010
ISO200	285	260	240.7 Ø11,12	16	C10012010
ISO250	335	310	290.7 Ø11,12	16	C10013010
ISO320	425	395	371 Ø14,12	20	C10014012

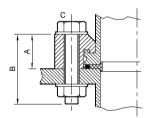


D= number required

Half Claw Clamp for use with Centering Ring (Tapped Holes)

Zinc plated mild steel body, stainless steel bolt

Zino piatea mila stee	i body, stairiicss sto	oi boit			
ISO63	22.5	35	M8	4	C10007151
ISO100	22.5	35	M8	8	C10007151
ISO160	23	40	M10	8	C10011151
ISO200	23	40	M10	12	C10011151
ISO250	23	45	M10	12	C10011151
ISO320	36.5	60	M12	12	C10014151
ISO400	36.5	60	M12	16	C10014151
ISO500	36.5	60	M12	16	C10014151

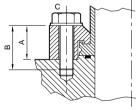


D= number required

Half Claw Clamp for use with Centering Ring (Clear Holes)

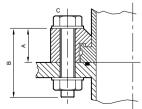
Zinc plated mild steel body, stainless steel bolt

ISO63	22.5	35	M8	4	C10007150
ISO100	22.5	35	M8	8	C10007150
ISO160	23	40	M10	8	C10011150
ISO200	23	40	M10	12	C10011150
ISO250	23	45	M10	12	C10011150
ISO320	30.5	60	M12	12	C10014150
ISO400	30.5	60	M12	16	C10014150
ISO500	30.5	60	M12	16	C10014150



D= number required

Zinc plated mild stee	l body, stainless stee	el bolt			
ISO63	18.6	35	M8	4	C10007093
ISO100	18.6	35	M8	8	C10007093
ISO160	19	40	M10	8	C10011093
ISO200	19	40	M10	12	C10011093
ISO250	19	40	M10	12	C10011093
ISO320	31	50	M12	12	C10014093
ISO400	31	50	M12	16	C10014093
ISO500	31	50	M12	16	C10014093

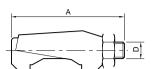


D= number required

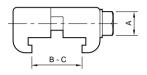
Half Claw Clamp for use with O-ring Groove (Clear Holes)

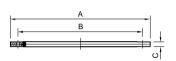
Zinc plated mild steel body, stainless steel bolt

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ISO63	18.6	45	M8	4	C10007149
ISO100	18.6	45	M8	8	C10007149

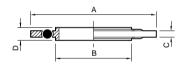


ISO63 requires 4 clamps; ISO80-160 requires 4-8 clamps; ISO200-320 requires 6-12 clamps; ISO400-500 requires 8-16 clamps





Use ISO polymer Co-Seals only for high vacuum applications <10⁻⁶ mbar). In other applications, use the trapped O-ring seal; O-ring seals have higher mechanical strength.



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Size

Zinc plated 1.1181 steel					
ISO63/ISO250	60	22	33	M10	C10007090
ISO320/ISO500	75	32	42	M12	C10014090

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Ordering Number

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В

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Claw Clamps

Aluminum					
ISO63/100	-	22	33	M8	C10007156
ISO160/250	-	24	38	M10	C10011094
ISO320/500	-	35	56	M12	C10014094

Co-Seal				
Nylon, nitrile				
ISO40	101	80	4.2	B27158458
ISO63	116	110	4.2	B27158063
ISO100	151	145	4.2	B27158070
ISO160	200	190	5.7	B27158073
Fluoroelastomer				
ISO40	101	80	4.2	B27158457
ISO63	116	110	4.2	B27158064
ISO100	151	145	4.2	B27158071
ISO160	200	190	5.7	B27158074

Aluminum centering ring, aluminum outer ring

uoroelastomer

ISO63	95	70	3.9	8	C10521001
ISO100	128	102	3.9	8	C10523001
ISO160	179	153	3.9	8	C10524001



Centering Ring with O-Ring

Stainless steel AISI 316L centering ring

Size

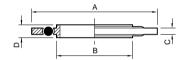
Nitrile				
ISO63	70	3.9	8	C10007173
ISO80	83	3.9	8	C10008173
ISO100	102	3.9	8	C10009173
ISO160	153	3.9	8	C10011173
ISO200	213	3.9	8	C10012173
ISO250	261	3.9	8	C10013173
ISO320	318	5.6	14	C10014173
ISO400	400	5.6	14	C10015173
ISO500	501	5.6	14	C10016173
Fluoroelastomer				
ISO63	70	3.9	8	C10007174
ISO80	83	3.9	8	C10008174
ISO100	102	3.9	8	C10009174
ISO160	153	3.9	8	C10011174
ISO200	213	3.9	8	C10012174
ISO250	261	3.9	8	C10013174
ISO320	318	5.6	14	C10014174
ISO400	400	5.6	14	C10015174
ISO500	501	5.6	14	C10016174

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B27158167

B27158168

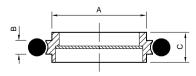


Trapped O-Ring

Stainless steel AISI 316L centering ring with aluminum outer ring

N	iŧ	ril	ما

Nitrile					
ISO40	63	41	3.9	8	B27158175
ISO63	95	70	3.9	8	B27158176
ISO80	109	83	3.9	8	B27158169
ISO100	128	102	3.9	8	B27158177
ISO160	179	153	3.9	8	B27158178
ISO200	239	213	3.9	8	B27158080
ISO250	287	261	3.9	8	B27158180
ISO320	358	318	5.6	14	B27158182
ISO400	440	400	5.6	14	B27158183
ISO500	541	501	5.6	14	B27158184
Fluoroelastomer					
ISO40	63	41	3.9	8	B27158165
ISO63	95	70	3.9	8	B27158170
ISO80	109	83	3.9	8	B27158181
ISO100	128	102	3.9	8	B27158171
ISO160	179	153	3.9	8	B27158172
ISO200	239	213	3.9	8	B27158081
ISO250	287	261	3.9	8	B27158143
ISO320	358	318	5.6	14	B27158166



ISO Centering Ring and Screen

ISO400

ISO500

Stainless steel AISI 316I DIN 1.4404 Mesh Ø 3.3 mm aperture, Ø 0.9 mm wire Fluoroelastomer O-ring

5.6

5.6

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ISO63	70	3.9	8	C10521085
ISO80	83	3.9	8	C10522085
ISO100	102	3.9	8	C10523085
ISO160	153	3.9	8	C10524085

440

541

400

501

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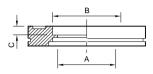
Blanking Flange for use with Collar Flange
Stainless steel AISI 316L DIN 1.4404

Α

Stainless steel AISI 3	16L DIN 1.4404		
ISO63	12	95	C10007049
ISO80	12	110	C10008015
ISO100	12	130	C10009049
ISO160	12	180	C10011049
ISO200	12	240	C10012049
ISO250	12	290	C10013049
ISO320	17	370	C10014003
ISO500	17	550	C10016003

С

Ordering Number

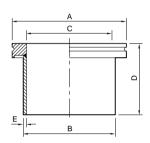


ISO Bored Flange

Size

Stainless steel AISI 316L DIN 1.4404

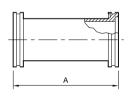
ISO63	60.2	63.5	5.5	C10007138
ISO100	98.3	102	5.5	C10009157
ISO160	148	152	5.5	C10011068
ISO200	197	203	5.5	C10012053
ISO250	248	254	5.5	C10013059



Collar Weld Stub

Stainless steel AISI 316L DIN 1.4404

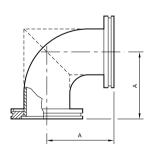
Otalilicos sicci / lioi o loc bill	1.7707					
ISO63	95	76	70	100	3.2	C10007032
ISO80	110	76	83	100	3.2	C10008013
ISO100	130	108	102	100	3.2	C10009032
ISO160	180	159	153	100	3.2	C10011032
ISO200	240	219.1	213	100	3.2	C10012032
ISO250	290	267	261	100	3.2	C10013032



Nipple

Stainless steel AISI 316L DIN 1.4404

ISO63	176	C10007140
ISO100	216	C10009160
ISO160	276	C10011071
ISO200	356	C10012054
ISO250	416	C10013060

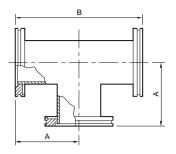


Elbow 90°

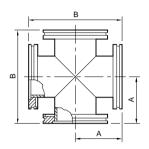
Stainless steel AISI 316I DIN 1.4404

Otali licos steel / tiol t	STOLDIN 1.4404	
ISO63	88	C10007203
ISO100	108	C10009203
ISO160*	138	C10011203
ISO200*	178	C10012203
ISO250*	208	C10013203

^{*} Shown dotted

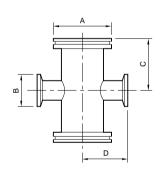


Size	A	В	С	D	E	F	Ordering Number
T-piece							
Stainless steel AISI 3	316L DIN 1.4404						
ISO63	88	176					C10007207
ISO100	108	216					C10009207
ISO160	138	276					C10011207
ISO200	178	356					C10012207



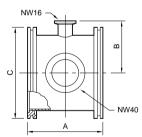
Cross Piece

ISO100	108	216	C10009211
ISO63	88	176	C10007211
Stainless steel AISI 310	6L DIN 1.4404		



ISO to NW Reducing Cross

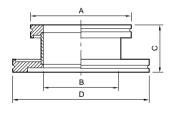
Stainless steel AISI 316L DI	N 1.4404				
ISO63/NW40	95	55	102	76	C10007232
ISO100/NW25	130	40	130	98	C10009231
ISO160/NW40	180	55	160	121	C10011232



Connector with Two Lateral Flanges

Stainless steel AISI 316L DIN 1.4404

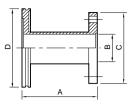
ISO63	88	60	95	C10007215
ISO100	108	75	130	C10009215
ISO160	138	100	180	C10011215



ISO/ISO Adapting Piece

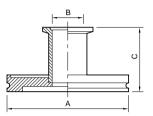
Stainless steel AISI 316L DIN 1.4404

ISO80/ISO63	95	60	105	110	95	C10008021
ISO80/ISO100	110	73	105	130	110	C10009158
ISO100/ISO63	95	70	50	130	95	C10009111
ISO160/ISO63	95	70	50	180	95	C10011110
ISO160/ISO80	110	73	242	180	110	C10011069
ISO160/ISO100	130	102	50	180	130	C10011111

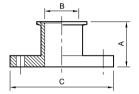


Supplied with bolts for tapped holes and bolts plus nuts and washers for plain holes

Size	Α	В	С	D	E	F	Ordering Number
Adaptor ISO Bolted/ISO	Collar						
Stainless steel AISI 316L DI	N 1.4404						
ISO40 bolted/ISO63	106	41	100	95			C10007087
ISO63 bolted/ISO63	160	70	130	95			C10007155



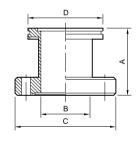
Stainless steel AISI 316L DIN	N 1.4404			
ISO63/NW25	95	25	50	C10007115
ISO63/NW40	95	40	50	C10007116
ISO100/NW40	130	40	50	C10009122
ISO63/NW50	95	50	50	C10007118
ISO80/NW50	110	50	118	C10008003
ISO100/NW50	130	50	50	C10009123
ISO80/NW40	110	40	118	C10008002



*Supplied with bolts for tapped holes and bolts plus nuts and washers for plain holes

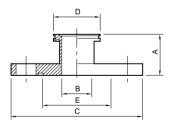
Adaptor ISO Bolted/NW

Stainless steel AISI 316L DIN	1.4404				Europe	N. America
ISO40 bolted/NW50*	50	41	100		C10005080	C10005080
ISO40 bolted/NW40	69	40	100	No bolts supplied	N/A	A1516
ISO63 bolted/NW50	50	50	130	No bolts supplied	N/A	A1509
ISO63 bolted/NW40	68	40	130	No bolts supplied	N/A	A1448
ISO63 bolted/NW40	50	40	130	No bolts supplied	N/A	A1574
ISO40/ISO63 bolt kit for clear and tapped holes					N/A	NGV515000



Adaptor ISO/CF

Stainless steel AISI 316L DIN	1.4404				
ISO63/DN63CF/41/2	110	60	114	95	C10007130
ISO100/DN100CF/6	111	98	152	130	C10009149
ISO100/DN160CF/8	113	148	203	180	C10011063



Adaptor ISO/ASA

Stainless steel AISI 316L DIN 1.4404

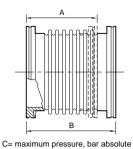
Without	O-rina	aroove

ISO63/2 inch ASA	106	60.2	152	95	C10007131
ISO80/3 inch ASA	106	72.9	190	110	C10008011
ISO100/3 inch ASA	106	98.3	190	130	C10009152
ISO100/4 inch ASA	106	98.3	229	130	C10009154
ISO160/6 inch ASA	112	148	279	180	C10011066

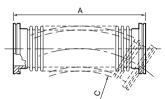
vvitn	O-ring	groove

ISO63/2 inch ASA	106	60.2	152	95	88.5	C10007132
ISO63/3 inch ASA	106	60.2	190	95	114.5	C10007134

Ordering Number



Flexible Bellows				
Stainless steel AISI 3	316L DIN 1.4404			
ISO63	106	127	1.5	C10007670
ISO80	106	127	1.5	C10008028
ISO100	107	127	1.5	C10009670
ISO160	170	220	1.5	C10011670
ISO200	170	220	1.5	C10012670
ISO250	170	220	1.5	C10013670



C= minimum band radius, static
D= minimum band radius, dynamic
E= maximum pressure, bar absolute

Flexible Pipelines

Size

Stainless steel AISI 31	6L DIN 1.4404				
ISO63	250	140	360	1.4	C10007285
ISO100	250	200	550	1.3	C10009285
ISO63	500	140	360	1.4	C10007286
ISO100	500	200	550	1.3	C10009286
ISO63	750	140	360	1.4	C10007288
ISO80	750	160	420	1.4	C10008024
ISO100	750	200	550	1.3	C10009288
ISO63	1000	140	360	1.4	C10007287
ISO100	1000	200	550	1.3	C10009287

Pump Hook-Up Kits



Pump hook-up kits are available as convenient boxed sets containing components, seals and clamps to connect pumps to mating flanges.

We offer a number of standard hook-up kits to simplify the installation of dry vacuum pumps.

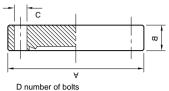
Each kit has the required spool piece (if needed), bellows, seals and claw-clamps for direct connection of the dry pump to the appropriate size fore-line. All exhaust lines include NW40 braided flexibles.

Kits are available with gate valves and can include a dead leg to reduce particulates from falling directly into the pump inlet.

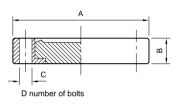
For greater protection, KIT7-14-100 includes an ITO catchpot. KIT7-15-100 can be used with (but does not include) a Water Cooled Trap. Consult Edwards for more details.

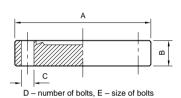
Product Description	Order No.
Straight inlet, no gate valve, 40 mm fore-line	KIT710040
Straight inlet, no gate valve, 50 mm fore-line	KIT710050
Straight inlet, no gate valve, 63 mm fore-line	KIT710063
Straight inlet, no gate valve, 100 mm fore-line	KIT710100
Straight inlet, pneumatic gate valve, 63 mm fore-line	KIT712063
Straight inlet, pneumatic gate valve, 100 mm fore-line	KIT712100
Dead-leg inlet, pneumatic gate valve, 100 mm fore-line	KIT713100
Catchpot, pneumatic gate valve, 100 mm fore-line	KIT714100
Dead-leg inlet, pneumatic gate valve, 100 mm fore- line for water cooled trap (not included)	KIT715100

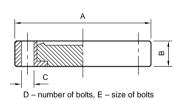
CF Flange Fittings

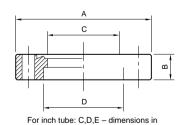


-	c		
			В
-	١	√	
D	number of bolt	s	









For inch tube: E – tube OD

Blank Flange Non-Rotatable Clear

Stainless steel AISI 304L DIN 1.4306

Metric	Inch					
DN16CF	11/3	34	7.6	4.3	6	C10001200
DN40CF	2¾	70	12.7	6.7	6	C10005200
DN63CF	4½	114	17.4	8.3	8	C10007400
DN100CF	6	152	19.9	8.3	16	C10009400
DN160CF	8	203	22.3	8.3	20	C10011300
DN200CF	10	254	24.6	8.3	24	C10012300

Ordering Number

Blank Flange Rotatable Clear

Stainless steel AISI 304L DIN 1.4306

Otali 11000 otool 7 tit	01 00 1E DII 1	1. 1000				
Metric	Inch					
DN16CF	11/3	34	7.6	4.3	6	C10001201
DN40CF	2¾	70	12.7	6.7	6	C10005201
DN100CF	6	152	19.9	8.3	16	C10009401

Blank Flange Non-Rotatable Tapped

Stainless steel AISI 304L DIN 1.4306

Metric	Inch						
DN16CF	1⅓	34	7.6	4.3	6	M4	C10001202
DN40CF	2¾	70	12.7	6.7	6	M6	C10005202
DN63CF	4½	114	17.4	8.3	8	M8	C10007402
DN100CF	6	152	19.9	8.3	16	M8	C10009402
DN250CF	12	304	27.3	8.3	32	M8	C10013302

Blank Flange Rotatable Tapped

Stainless steel AISI 304L DIN 1.4306

Metric Inch DN100CF 6 C10009403 152 19.9 8.3 16 M8 DN160CF 8 203 22.3 8.3 20 M8 C10011303

Bored Weld Flange Non-Rotatable Clear

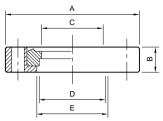
Stainless steel AISI 304L DIN 1.4306

For metric tube

Metric	Inch					
DN40CF	2¾	70	12.7	36.9	38.2	C10005207
DN40CF	2¾	70	12.7	40.1	41.3	C10005208
DN63CF	4½	114	17.4	49.6	51.1	C10007405
DN100CF	6	152	19.9	99.4	101.9	C10009405
DN200CF	10	254	24.6	200.4	203.5	C10012305

For inch tube

Metric	Inch						
DN63CF	4½	114	17.4	1.875	2.01	2	C10007405
DN100CF	6	152	19.9	3.81	4.01	4	C10009405
DN200CF	10	254	24.6	7.812	8.02	8	C10012305

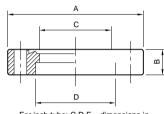


For inch tube: C, D, F - dimensions in inches For inch tube: F - tube OD

Bored Weld Fla	inge Rotatal	ole Clea	r					
Stainless steel Al	SI 304L DIN	1.4306						
For metric tube								
Metric	Inch							
DN40CF	2¾	70	12.7	36.9	38.2	38.7		C10005213
DN63CF	4½	114	17.4	49.6	51.1	68.0		C10007407
DN63CF	4½	114	17.4	61.2	63.6	68.0		C10007408
For inch tube								
Metric	Inch							
DN40CF	23/4	70	12.7	1.375	1.51	38.7	1½	C10005213
DN63CF	4½	114	17.4	1.875	2.01	68.0	2	C10007407
DN63CF	4½	114	17.4	2.375	2.51	68.0	2½	C10007408
Bored Weld Fla	inge Non-Ro	otatable	Tappe	d				

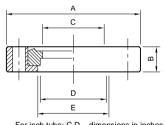
С

Α



For inch tube: C,D,F - dimensions in inches E - size of bolts For inch tube: F - tube OD

For metric tube							
Metric	Inch						
DN16CF	11/3	34	7.6	12.7	12.7	M4	C10001218
DN40CF	2¾	70	12.7	36.9	38.2	M6	C10005219
DN40CF	2¾	70	12.7	40.1	41.3	M6	C10005220
DN63CF	4½	114	17.4	49.6	51.1	M8	C10007409
DN100CF	6	152	19.9	99.4	101.9	M8	C10009407
DN160CF	8	203	22.3	149.7	152.6	M8	C10011307



For inch tube: C,D- dimensions in inches F- size of bolts Dimensions of suitable inch tube are shown in the table for non-rotatable tapped flanges (above)

Bored Weld	l Flange	Rotatable	Tapped
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Stainless steel AISI 304L DIN 1.4306

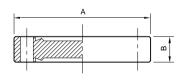
Stainless steel AISI 304L DIN 1.4306

For metric tube

Size

•								
DN63CF	4½	114	17.4	61.2	63.6	68.0	M8	C10007414
DN63CF	4½	114	17.4	49.6	51.1	68.0	M8	C10007413
DN40CF	23/4	70	12.7	36.9	38.2	38.7	M6	C10005227
Wictio	111011							

For inch tube								
Metric	Inch							
DN63CF	41/2	114	17.4	1.875	2.01	68.0	5/16-24	C10007415
DN100CF	6	152	19.9	3.81	4.01	104.9	5/16-24	C10009410

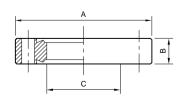


Double-Sided Blank Flange Clear

Stainless steel AISI 304L DIN 1.4306

Metric Inch

DN16CF	1⅓	34	7.6	C10001233
DN40CF	2¾	70	12.7	C10005233

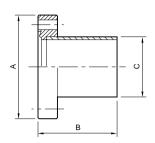


Double-Sided Bored Flange Clear

Stainless steel AISI 304L DIN 1.4306

Metric Inch

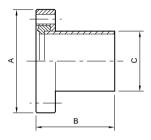
DN100CF 6 152 19.8 99.4 C10009412



Half-Nipple Nor	n-Rotatable	Clear			
Stainless steel Al	SI 304L DIN	1.4306			
Metric	Inch				
DN16CF	1⅓	34	38	19	C10001250
DN40CF	2¾	70	63	38	C10005250
DN63CF	4½	114	105	64	C10007450
DN100CF	6	152	135	102	C10009450
DN160CF	8	203	167	152	C10011450

Ordering Number

С

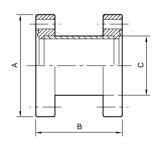


Half-Nipple Rotatable Clear

Size

Stainless steel AISI 304L DIN 1.4306

Metric	Inch				
DN40CF	2¾	70	63	38	C10005251
DN63CF	4½	114	105	64	C10007451
DN100CF	6	152	135	102	C10009451
DN160CF	8	203	167	152	C10011451

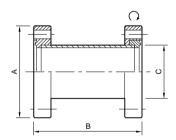


Full-Nipple Non-Rotatable Clear

Stainless steel AISI 304L DIN 1.4306

Metric Inch

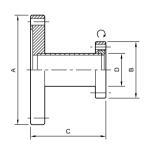
DN40CF 2¾ 70 126 38 C10005260



Full-Nipple Rotatable Clear

Stainless steel AISI 304L DIN 1.4306

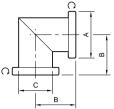
Metric	Inch				
DN40CF	2¾	70	126	38	C10005261
DN63CF	4½	114	210	64	C10007461
DN100CF	6	152	270	102	C10009461



Reducing Nipple Rotatable Clear

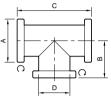
Stainless steel AISI 304L DIN 1.4306

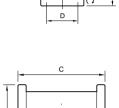
Metric	Inch					
DN40/16CF	2¾/1⅓	70	34	70	19	C10005370
DN63/40CF	4½/2¾	114	70	70	38	C10007570
DN100/40CF	6/23/4	152	70	70	38	C10009570

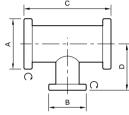


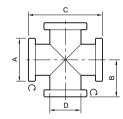


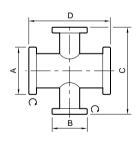
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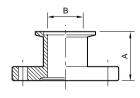












Size	Α	В	С	D	E	F	Ordering Number
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Elbow 90 ° Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric	Inch				
DN16CF	11/3	34	38	19	C10001300
DN40CF	2¾	70	63	38	C10005300
DN63CF	41/2	114	105	64	C10007500

Tee Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric	Inch		
DNIACCE	23/.	70	6

DN40CF	2¾	70	63	126	38	C10005310
DN63CF	4½	114	105	210	64	C10007510

Reducing Tee Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric DN40/16CF	Inch					
	23/4/11/3	70	34	126	60	C10005350
DN63/40CF	4½/2¾	114	70	210	77	C10007551
DN100/40CF	6/23/4	152	70	270	95	C10009551
DN160/63CF	8/41/2	203	114	334	120	C10011552

4-Way Cross Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric Inch

C10005320 DN40CF 2¾ 70 63 126 38

Reducing Cross Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric Inch

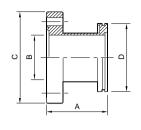
DN40/16CF 23/4/11/3 126 C10005360 70 120 DN100/40CF 6/23/4 152 70 190 270 C10009561

Adaptors NW/CF

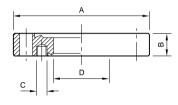
Stainless steel AISI 316L DIN 1.4404

Metric/inch

NW16/DN16CF/11/3	52.7	15.8	C10503104
NW16/DN40CF/23/4	45.3	15.8	C10503105
NW25/DN40CF/23/4	45.3	22	C10503207
NW40/DN40CF/23/4	45.3	40	C10503305
NW50/DN63CF/41/2	49.5	50	C10503405



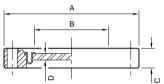
Size	Α	В	С	D	E	F	Ordering Number
Adaptors ISO/CF							
Stainless steel AISI 316L DI	N 1.4404						
Metric/inch							
ISO63/DN63CF/41/2	110	60	114	95			C10007130
ISO100/DN100CF/6	111	98	152	130			C10009149
ISO160/DN160CF/8	113	148	203	180			C10011063



Zero Length Adaptor Major Clear/Minor Tapped

Stainless steel AISI 304L DIN 1.4306

010000 0100.701	00 .2 2	.000				
Metric	Inch					
DN40/16CF	23/4/11/3	70	12.7	M4	13.2	C10005240
DN63/40CF	4½/2¾	114	17.5	M6	36.9	C10007440
DN100/40CF	6/23/4	152	19.9	M6	36.9	C10009440
DN100/63CF	6/41/2	152	19.9	M8	61.2	C10009441
						_
DN63/40CF	$4\frac{1}{2}/2\frac{3}{4}$	114	17.5	1/4-28	36.9	C10007441



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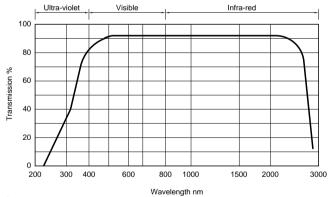
Page 218

Bakeable to 350 °C, at no greater than 2 to 3 °C per minute.
Use annealed copper gaskets.

NW Zero Length Kodial Viewport

Stainless steel AISI 304L DIN 1.4306

Metric	Inch					
DN16CF	11/3	34	16	12.7	1	C10001600
DN40CF	2¾	70	38	12.7	2.5	C10005600
DN63CF	4½	114	63	17.4	3	C10007600
DN100CF	6	152	89	19.9	4	C10009600
DN160CF	8	203	136	22.3	6.5	C10011600



Kodial transmission curve

Bakeable to 200 °C, at no greater than 2 to 3 °C per minute.
Use annealed copper gaskets.

Zero Length Quartz Viewport
Stainless stool AISI 2041 DIN 1 42

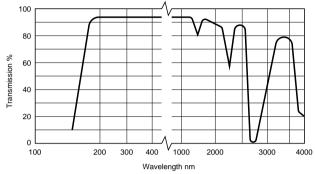
Metric	Inch

Size

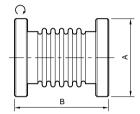
DN40CF	2¾	70	29.5	12.7	4	C10005610
DN63CF	4½	114	60	17.3	5	C10007610

Ε

С



Quartz transmission curve.



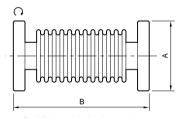
C – maximum pressure, bar absolute

Hydroformed Bellows Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric	Incl

DN16CF	11/3	34	110	1.2	C10001340
DN40CF	2¾	70	160	1.2	C10005340

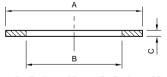


- C Minimum bend radius, static D Minimum bend radius, dynamic E Maximum pressure, bar absolute

Flexible Hose Rotatable

Stainless steel AISI 304L DIN 1.4306

Metric	Inch						
DN40CF	2¾	70	250	80	260	1.5	C10005330
DN63CF	41/2	114	250	140	360	1.5	C10007530
DN16CF	11/3	34	500	30	130	1.5	C10001331
DN40CF	2¾	70	500	80	260	1.5	C10005331
DN63CF	41/2	114	500	140	360	1.5	C10007531
DN100CF	6	152	750	200	550	1.5	C10009532
DN40CF	2¾	70	1000	80	260	1.5	C10005333
DN63CF	4½	114	1000	140	360	1.5	C10007533

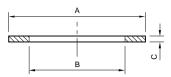


D – For flange OD, mm; E – For flange OD, inch F – Number per pack

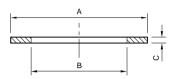
Copper Gaskets

Metric	Inch							
DN16CF	11/3	21	16	2	34	1.33	10	C10001290
DN40CF	2¾	48	37	2	70	2.75	10	C10005290
DN63CF	4½	82	63	2	114	4.5	10	C10007490
DN100CF	6	120	101	2	152	6	10	C10009290
DN160CF	8	171	152	2	203	8	5	C10011290
DN200CF	10	222	203	2	254	10	5	C10012290
DN250CF	12	270	254	2	304	12	5	C10013290

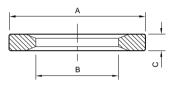
6



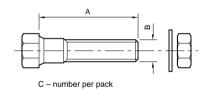
 $\label{eq:D-Forflange} \begin{array}{l} D-For\,flange\,OD,\,mm;\,E-For\,flange\,OD,\\ inch\\ F-Number\,per\,pack \end{array}$



 $\label{eq:D-For flange OD, mm; E-For flange OD, inch F-Number per pack}$



D – For flange OD, mm; E – For flange OD, inch F – Number per pack



Annealed	Conner	Gackate

Α

Size

Annealed Copper Gaskets								
Metric	Inch							
DN16CF	11/3	21	16	2	34	1.33	5	C10001270
DN40CF	2¾	48	37	2	70	2.75	5	C10005270
DN63CF	4½	82	63	2	114	4.5	5	C10007270
DN100CF	6	120	101	2	152	6	5	C10009270
DN160CF	8	171	152	2	203	8	5	C10011270
DN200CF	10	222	203	2	254	10	5	C10012270
DN250CF	12	270	254	2	304	12	5	C10013270

С

Ε

Ordering Number

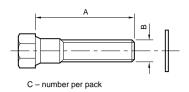
Silver Plated Copper Gaskets

Metric	Inch							
DN16CF	11/3	21	16	2	34	1.33	5	C10001280
DN40CF	2¾	48	37	2	70	2.75	5	C10005280
DN63CF	4½	82	63	2	114	4.5	5	C10007280
DN100CF	6	120	101	2	152	6	5	C10009280
DN160CF	8	171	152	2	203	8	5	C10011280
DN200CF	10	222	203	2	254	10	5	C10012280

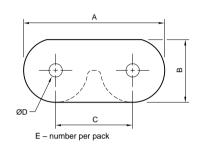
Fluoroelastomer Gaskets

Metric	Inch							
DN16CF	1⅓	29	19	2	34	1.33	2	C10001620
DN40CF	2¾	50	38	3	70	2.75	2	C10005620
DN63CF	4½	76	64	3	114	4.5	2	C10007620
DN100CF	6	112	100	3	152	6	2	C10009620
DN160CF	8	162	150	3	203	8	2	C10011620

HEX Head Nut,	Bolt and W	ashers	for Clear	Hole	CF Flanges
Standard					
Metric	Inch				
DN16CF	11/3	20	M4	25	C10001630
DN40CF	2¾	35	M6	25	C10005630
DN63CF	4½	45	M8	25	C10007630
DN100CF	6	50	M8	25	C10009630
DN160CF	8	60	M8	25	C10011630
DN200CF	10	60	M8	25	C10012630
DN40CF	2¾	35	1/4-28	25	C10005640
DN200CF	10	60	5/16-24	25	C10012640
Silver Plated					
Metric	Inch				
DN40CF	2¾	35	M6	25	C10005650
DN63CF	4½	45	M8	25	C10007650
DN100CF	6	50	M8	25	C10009650
DN160CF	8	60	M8	25	C10011650
DN200CF	10	60	M8	25	C10012650



Size		Α	В	С	D	E	F	Ordering Number
HEX Head Bolt	and Washe	ers for Ta	apped F	lole CI	F Flange	S		
Standard								
Metric	Inch							
DN40CF	23/4	25	M6	25				C10005670
DN63CF	4½	30	M8	25				C10007730
Silver Plated								
Metric	Inch							
DN40CF	23/4	25	M6	25				C10005690
DN63CF	4½	30	M8	25				C10007690
DN100CF	6	35	M8	25				C10009690
Plate Nuts								
Metric	Inch							
DN40CF	23/4	41	11	29	M6	25		C10005710
DN63CF	4½	51	12	35	M8	25		C10007710
DN40CF	2¾	41	11	29	1/4-28	25		C10005720



Cord and Tubing

Lubrication All O-rings, nitrile rubber extruded cord and sheet used in low vacuum applications should be lubricated with either vapor pump fluid, Fomblin[®] vacuum grease or Apiezon[®] grease M lubrication will prolong the life of the material and facilitate sealing.

Apply the oil or grease very sparingly and evenly, coating the seal to give it no more than a shining surface with no visible smears. Excessive lubrication may cause leaks.

In general, but with certain exceptions dictated by common sense, seals used in high vacuum applications should be lubricated, but even more sparingly, using vapor pump fluid.

Cleaning The only necessary and recommended method of cleaning O-rings and nitrile rubber extruded cord or sheet is by wiping with a dry, lint free, soft cloth. Most solvent fluids are liable to be absorbed by fluoroelastomer and nitrile rubber, swelling these materials and subsequently outgassing into the system.

Nitrile Rubber Cord

Nitrile cord should be cut perfectly square and to a length which is 5% above the mean circumference of the groove in which it is laid. Compression and sealing of the butt joint is thereby assured.

Ordering Information

Product Description	Order No.
Nitrile rubber cord	
0.275 inch (7 mm) diameter	H02101008
0.312 inch (8 mm) diameter	H02101009
0.500 inch (12.7 mm) diameter	H02101015

State exact length required (per metre).

Vacuum Tubing

This high quality neoprene rubber vacuum tubing is suitable for use down to approximately 10⁻⁴ mbar. We recommend that you use the shortest length possible.

Product Description	Order No.
Rubber vacuum tube, 1 m lengths	
5 mm bore, 19 mm external diameter	H02100002
7 mm bore, 17 mm external diameter	H02100003
9 mm bore, 25 mm external diameter	H02100004
12 mm bore, 28 mm external diameter	H02100005
20 mm bore, 34 mm external diameter	H02100006
Flexible hose connection*	C06600025

Neoprene, steel reinforced, 12 inch (305 mm) long, to suit 1% inch external diameter tube

Oils, Fluids, Sealants and Greases



We strongly recommend that you use only the recommended grades and qualities of fluids and sealants, to maintain the high performance of Edwards products. If you use inferior materials, this can lead to a reduction in the pump or system efficiency, partial or complete failure of the equipment, and excessive outgassing. We think it is a false economy to use cheaper fluids and sealants which are untried for many demanding applications.

All our fluids and sealants are tested under formal laboratory conditions. In addition, we have gained considerable on-site experience through our own use of these materials and by maintaining close contact with users who have specific problems. As many cases of suspected equipment under-performance are eventually traced to the use of unsuitable or unsatisfactory fluids and sealants, we are pleased to advise on the correct selection of fluids and sealants for your application.

Mineral Based Materials

These materials include rotary pump oils, Diffstak and diffusion pump oils and greases. They are available with or without various additives for different applications.

Silicone Based Materials

These materials are used for Diffstak and diffusion pump fluids and greases. They comprise either di-methyl siloxanes or phenyl methyl siloxanes.

Synthetic-Organic Compounds

These include various hindered esters, phenyl ethers and napthalene based compounds. They are offered for use in Diffstak and diffusion pumps, but they can also be used as a rotary pump oils in certain unique applications. Edwards can advise on the matching of the fluids to particular applications.

Fluorinated Materials (PFPE)

These are perfluoropolyethers. Perfluoropolyether is a fully fluorinated material free from other halogens and from hydrogen, and so is of particular value where freedom from hydrocarbons is important. It is inert to most reactive chemicals such as UF $_6$, F $_2$, O $_2$, and so on, and it does not polymerize when exposed to electron and most ion bombardment.

Perfluoropolyether fluid is available in grades suitable for use in rotary pumps. A low vapor pressure Fomblin® grease (AR555) is available which combines good lubrication properties with superior vacuum properties.

PFPE for Semiconductor Applications

The major growth in the use of perfluoropolyether (PFPE) compounds has been in applications where hostile process conditions quickly destroy normal hydrocarbon pump oils. This applies particularly in semiconductor processing. The corrosion resistant properties and chemical inertness of PFPE result in greatly increased operation times between oil changes and pump maintenance, and this provides a cost effective solution to many difficult pumping applications.

These are the basic properties of PFPE and the advantages for use in vacuum systems:

- Chemically Inert Ideal for pumping aggressive materials, particularly in semiconductor processes.
- High Oxidation Resistance Fluid is not damaged by repeated exposure to air at operating temperatures.
- Non-Inflammable No fire risk.
- High Thermal Resistance No residual tar compounds formed by overheating. Eventually reduced to gaseous products.
- Oxygen Compatible Allows absolutely safe pumping of oxygen (NASA approved for liquid oxygen systems). Maximum recommended operation temperature and pressure for 100% oxygen is 250 °C and 91.4 kg cm⁻² and 60 °C, 175.75 kg cm⁻².
- Non-Polymerization Does not polymerize on exposure to energetic particle bombardment (except hydrogen ions). This reduces the impact of backstreamed vapors, and is an important property where polymers cannot be tolerated (for example, in electron microscopes).
- Miscible with Most Common Solvents Allows pumping of solvent even without gas ballast.

Before charging with PFPE, thoroughly clean the pumps to achieve maximum advantage. If you do not have skilled technicians available, we recommend that you return the pumps to a Edwards Service Center to be cleaned and filled. Some models of high vacuum rotary pumps and mechanical booster pumps adapted for use with PFPE are available as standard and can be found in the appropriate sections of this catalog: these pumps are assembled and tested with PFPE

Safety note Perfluoropolyether is a fluorinated compound and will give-off toxic vapors if exposed to temperatures above 280 °C. Do not expose PFPE to naked flames and prohibit smoking in work areas.

Mechanical Pump Oils



Edwards supplies the widest range of oils of different viscosities and specifications to enable customers to obtain the best performance from mechanical pumps under different application conditions. Mineral oils are manufactured by a hydro treatment process to reduce carcinogenic risk. All are specially prepared for high vacuum use, having low vapor pressures even at high temperatures. The particular mechanical pump specification should be consulted to find which oil to use.

Ultragrade[®] Mineral Oils

Edwards offers a range of new oils, Ultragrade[®] 15, 19, 20 and 70, which result from a new process. Most manufacturers use a solvent refining process, whereas these oils are produced by a unique hydrotreating process. This process eliminates nitrogen, sulphur and oxygen and the aromatic hydrocarbons, leaving a clear base stock essentially free of impurities.

When combined with additives, the Ultragrade[®] oils give improved vacuum performance, thermal and oxidation stability and rust inhibition. The anti-oxidants included in the oils enable the pump to withstand high operating temperatures without oil degradation, so extending intervals between oil changes.

The properties of the oils allow them to be used in a wide range of applications. New Ultragrade® 70 oils are the best choice for large pumps used in heavy-duty, cycling applications. Contact Edwards or your local supplier for detailed recommendations.

Ultragrade Oil	Use In	Replaces
Ultragrade 15	E2M0.7, E2M1.5. Also suitable for cold start applications.	Edwards 8A
Ultragrade 19	RV pumps, E2M18	Supergrade A, Edwards 17 and 20
Ultragrade 70	E2M40 to E2M275	_
Ultragrade 20	EH boosters	Edwards 16 and 18

Ordering Information

Product Descript	tion	Order No.
Ultragrade 15	1 liter	H11026015
	12 x 1 liter	H11026012
	4 liter	H11026013
	4 × 4 liter	H11026011
	205 liter	H11026010
Ultragrade 19	1 liter	H11025015
	12 x 1 liter	H11025012
	4 liter	H11025013
	4 × 4 liter	H11025011
	205 liter	H11025010
Ultragrade 20	1 liter	H11024015
	12 x 1 liter	H11024012
	4 liter	H11024013
	4 × 4 liter	H11024011
	205 liter	H11024010
Ultragrade 70	4 liter	H11028013
	4 × 4 liter	H11028011
	205 liter	H11028010

Edwards TW has been developed for applications where rotary pump oils are likely to be exposed to reactive or corrosive gases. The oil is distilled hydrocarbon containing no additives, but unsaturates and aromatic links have been removed. The result is that the oil will last up to 20 times longer, depending on process, than refined mineral oils. Longer oil life significantly extends the intervals between oil changes.

Ordering Information

Product Descrip	otion	Ord	ler No.
		Europe	N. America
Edwards TW mineral oil	1 liter	H11012015	H02100001TW
	4 liter	H11012013	H02100002TW
	20 liter	H11012026	H02100003TW
	205 liter (55 US gal)	N/A	H02100004TW

Edwards 45 Oil

Edwards 45 is a hydrocarbon synthetic polymer whose molecular structure offers chemical inertness, high temperature stability and low vapor pressure (<10⁻⁷ mbar at 25 °C). It is commonly used in mass spectrometry applications because of its well defined peaks. Edwards 45 oil is non-toxic, non-corrosive and reclaimable.

Ordering Information

Product Description	Orde	r No.
	Europe	N. America
Edwards 45 oil		
1 liter	H11022015	H01800001
4 liter	H11022013	H01800003
12 x 1 liter	N/A	H01800005

V-Lube

The V-Lube range of oils offer good thermal stability and oxidation resistance and have been selected for use with the Stokes range of vacuum pumps. Choose from the following:

V-Lube Oil	Application
V-Lube CD	Chemical Dry and Chemical Dry Eagle pumps
V-Lube F	Microvac piston pumps
V-Lube G	Hot Microvac, 912H, 612MB

Product Description	Order No.
V-Lube CD oil	
3.8 liters (1 US gal)	254-539-004
19 liters (5 US gal)	254-539-003
208 liters (55 US gal)	085-048-764
V-Lube F oil	
5 liters (1.3 US gal)	H11030001
25 liters (6.6 US gal)	H11030002
205 liters (54 US gal)	H11030003
V-Lube G oil	
19 liters (5 US gal)	262-461-003
208 liters (55 US gal)	421-793-001
V-Lube H oil	
3.8 liters (1 US gal)	424-051-001
19 liters (5 US gal)	419-699-001
208 liters (55 US gal)	419-698-001

Mechanical Pump Oil Selection Chart

	111400000000000000000000000000000000000	0.0000000000000000000000000000000000000		01 openion 111	() () () () () () () () () ()	() T	®	@ # F	@; 6;	® 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(a)
	Olitagiade 13		Oiliagiade 20 Oiliagiade 70	Oillaglade 70	TW	06/6	1506	16/6	1514	25/6	1525
Mass spectrometers	•	•	•	•							
Electron microscopes	•	•		•							
Thin film sputtering	•	•		•							
Surface studies	•	•		•							
UHV systems	•	•		•							
Leak detection	•	•	•	•							
TV tubes		•	•	•							
Power valves		•	•	•							
Distillation		•	•	•	•						
Space studies		•		•							
₽ Furnaces		•	•	•							
EB welders		•		•							
Semiconductors					•	•	•			•	•
Impregnation		•	•	•							
Chemical pumping		•	•	•	•	•	•			•	•
Oxygen pumping						•	•			•	•
Radioactive						•	•			•	•
Packaging		•	•	•							
Mechanical booster			•					•	•		
Metallization		•		•		•					
Vapor pressure mbar 20 °C	5.8 × 10 ⁻⁶	1 × 10 ⁻⁸	2.1×10^{-7}	2.1×10^{-7}	1.3 × 10 ^{-6†}	4 × 10 ⁻⁶	5.2×10^{-7}	3 × 10 ⁻⁶	2.6×10^{-7}	4 × 10 ⁻⁸	1.3×10^{-7}
100 °C	3.0×10^{-2}	1.0×10^{-3}	3.0×10^{-3}	3×10^{-3}	ı	5×10^{-3}	1.3×10^{-3}	1×10^{-3}	1.3 × 10 ⁻⁴	6×10 ⁻⁵	3.9×10^{-5}
Molecular weight	385	420	200	009	430	1900	2400	2700	3500	3300	4600
Specific gravity at 15 °C	0.86	0.86	0.86	0.86	0.860	1.88	1.88	1.89	1.89	1.9	1.9
الله Viscosity cSt at 20 °C	104.2	143.7	352	222	155	64	02	168	140	276	250
at 40 °C	38.1	48.6	103	20	65	25	22	48	48	80	80
€ Pour point °C	-18	-16	-12	-12	-12	-50	-45	-45	-40	-35	-35
Flash point °C	220	230	260	230	243	none*	none*	none*	none*	none*	none*
Auto ignition point °C	355	355	365	360	270	none*	none*	$none^*$	none*	none*	none*
Sulphur content% mass/mass	0	0	0	0	0	0	0	0	0	0	0
Energetic particle impact		Condu	Conducting polymers formed	ormed			No po	lymers formed	No polymers formed (except with H_2 ions)	ions)	
🙎 Thermal stability	poob	poob	boob	poob	poor		Excellent -	- decomposes t	Excellent – decomposes to gas only above $300~^\circ\! extsf{C}^*$	* C *	
Oxidation resistance	poob	poob	boob	poob	poor to fair			Exce	Excellent		
ក្នុ Chemical resistance	fair	fair	fair	fair	poor to good			Exce	Excellent		
Radiation resistance	fair	fair	fair	fair	fair	900	d – but reacts	vith electro-pos	Good – but reacts with electro-positive metals (for example, sodium)	example, sodi	nm)

WARNING – Perfluoropolyether is a fluorinated compound which will give off toxic vapors if exposed to temperatures above 280 °C. The fluid should not be exposed to naked flames and smoking should be prohibited in the working area. Suitable for this application.

Krytox® is a registered trademark of Dupont Dow Elastomers

Perfluoropolyether Oils

Edwards now offers an extended range of Fomblin® and Krytox®, perfluoropolyether oils for use in rotary vacuum pumps. Fomblin® YVAC 06/6 and Krytox® 1506 are recommended for Edwards oil sealed rotary pumps and are practically a direct replacement for mineral oil in terms of viscosity and vapor pressure. Krytox® 1525 is suitable for use in rotary pumps requiring a viscosity equivalent to Fomblin® Y25 fluid. Fomblin® Y16/6 and Krytox® 1514 are recommended for use in perfluoropolyether adapted mechanical booster pumps.

Edwards, in conjunction with Ausimont UK, has developed Drynert fluid which contains anti-rust and anti-wear additives soluble in Fomblin[®]. These additives cover metallic surfaces with a protective, corrosion resistant film.

Ordering Information

Fomblin® YVAC 06/6 100 ml Rurope N. America 240 ml N/A H026004001 240 ml N/A H026004002 0.5 kg N/A H026004003 1 kg (532 ml) H11301019 H11301019 2 kg N/A H026004005 5 kg H11301020 H11301020 Krytox® 1506 fluid 0.5 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 H11307018 Krytox® 1525 fluid 0.5 kg N/A H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309018 5 kg (2660 ml) H11309020 H11309018 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 H11306019 2 kg N/A H026001005 H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5	Product Description	Order No.		
240 ml N/A H026004002 0.5 kg N/A H026004003 1 kg (532 ml) H11301019 H11301019 2 kg N/A H026004005 5 kg H11301020 H11301020 8 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309017 1 kg (526 ml) H11309020 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020			Europe	N. America
0.5 kg N/A H026004003 1 kg (532 ml) H11301019 H11301019 2 kg N/A H026004005 5 kg H11301020 H11301020 8 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001005 5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg H11308020 H11308019 2 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Fomblin® YVAC 06/6	100 ml	N/A	H026004001
1 kg (532 ml) H11301019 H11301019 2 kg N/A H026004005 5 kg H11301020 H11301020 8 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001005 5 kg N/A H026001005 5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008001 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008005 0.5 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		240 ml	N/A	H026004002
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5 kg H11301020 H11301020 Krytox® 1506 fluid 0.5 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008005 1 kg (529 ml) H11312019 H11312019 2 kg N/A		1 kg (532 ml)	H11301019	H11301019
Krytox® 1506 fluid 8 kg N/A H026004006 Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (52		2 kg	N/A	H026004005
Krytox® 1506 fluid 0.5 kg N/A H11307017 1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H1131202		5 kg	H11301020	H11301020
1 kg (532 ml) H11307018 H11307018 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309020 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		8 kg	N/A	H026004006
Krytox® 1525 fluid 5 kg (2660 ml) H11307020 H11307020 Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Krytox [®] 1506 fluid	0.5 kg	N/A	H11307017
Krytox® 1525 fluid 0.5 kg N/A H11309017 1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		1 kg (532 ml)	H11307018	H11307018
1 kg (526 ml) H11309018 H11309018 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		5 kg (2660 ml)	H11307020	H11307020
Fomblin® Y16/6 fluid 5 kg H11309020 H11309020 Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Krytox [®] 1525 fluid	0.5 kg	N/A	H11309017
Fomblin® Y16/6 fluid 0.5 kg N/A H026001003 1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 Krytox® 1514 fluid 0.5 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		1 kg (526 ml)	H11309018	H11309018
1 kg (529 ml) H11306019 H11306019 2 kg N/A H026001005 5 kg H11306020 H11306020 8 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		5 kg	H11309020	H11309020
2 kg N/A H026001005 5 kg H11306020 H11306020 8 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Fomblin® Y16/6 fluid	0.5 kg	N/A	H026001003
5 kg H11306020 H11306020 8 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		1 kg (529 ml)	H11306019	H11306019
Krytox® 1514 fluid 8 kg N/A H026001006 Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		2 kg	N/A	H026001005
Krytox® 1514 fluid 0.5 kg N/A H11308017 1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		5 kg	H11306020	H11306020
1 kg (529 ml) H11308018 H11308018 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		8 kg	N/A	H026001006
Fomblin® 25/6 fluid 5 kg (2646 ml) H11308020 H11308020 Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Krytox [®] 1514 fluid	0.5 kg	N/A	H11308017
Fomblin® 25/6 fluid 100 ml N/A H026008001 0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		1 kg (529 ml)	H11308018	H11308018
0.5 kg N/A H026008003 1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		5 kg (2646 ml)	H11308020	H11308020
1 kg (529 ml) H11312019 H11312019 2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021	Fomblin® 25/6 fluid	100 ml	N/A	H026008001
2 kg N/A H026008005 8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		0.5 kg	N/A	H026008003
8 kg N/A H026008006 50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		1 kg (529 ml)	H11312019	H11312019
50 kg N/A H026008007 Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		2 kg	N/A	H026008005
Drynert 25/6 fluid 1 kg (529 ml) H11312021 H11312021		8 kg	N/A	H026008006
3(4 4 7		50 kg	N/A	H026008007
5 kg (2646 ml) H11312025 H11312025	Drynert 25/6 fluid	1 kg (529 ml)	H11312021	H11312021
		5 kg (2646 ml)	H11312025	H11312025

Single Stage and Rough Pump Oil Selection Chart

			LOWVAC 60	V-Lube CD	V-Lube F	V-Lube G	V-lube H
	Vapor pressure mbar	20 °C	7.5 × 10 ⁻⁵	<1.3	<1.3	<1.3	<1.3
		100 °C	3.9 × 10 ⁻²	<1.3	<1.3	<1.3	<1.3
ata	Molecular weight		485	350-500	350-500	350-500	350-500
a	Specific gravity at 20 °C		0.80	0.87-0.89	0.86-0.88	0.88-0.89	0.88-0.91
in Si	Viscosity cSt at 40 °C	0	59.1	68	95.5-100	183-191	208-220
lect	Pour point °C		-45	-31	-36	-30	-25
_	Flash point °C		209	210	223	216	220
	Auto ignition point °C		360	343	TBC	343	343
	Sulphur content% mass/	/mass	0	0	0.281	0	0
	Energetic particle impac	t		Con	ducting polymers for	med	
ies	Thermal stability		good	good	good	good	good
per	Oxidation resistance		good	good	good	good	good
Pro	Chemical resistance		fair	fair	fair	fair	fair
	Radiation resistance		fair	fair	fair	fair	fair

Vapor Pump Fluids



Edwards supplies a range of fluids of different vapor pressures and physical properties. From this range, you can choose the optimum fluid for your applications.

In general, the more volatile fluids are used with vapor booster pumps and for vapor diffusion pumps used on industrial processes (for example, decorative coating and vacuum furnaces) where high gas loads are encountered and high critical backing pressure is advantageous. The less volatile fluids are used for processes or experiments requiring more exacting high vacuum conditions. The least volatile fluids are used for clean or ultra high vacuum applications (mass spectrometry, electron probe apparatus, surface studies, and so forth). Fluid selection depends also on the particular physical and chemical characteristics of the fluids (apart from vapor pressure).

Edwards has a long history of co-operation with various fluid manufacturers in the development of new pumping fluids and is well placed to advise in cases of uncertainty.

AP201 Vapor Booster Pump Fluid

Apiezon[®] AP201 is a hydrocarbon fluid prepared by molecular distillation and protected against oxidation by a thermally stable additive of matched vapor pressure. It has an auto ignition temperature of 305 °C.

It exhibits a fair degree of resistance to chemical degradation (so that high throughputs of air and water vapor can be pumped without damage to the fluid) and it can withstand limited accidental admission of atmospheric air at operating temperature. The fluid has low viscosity which permits easy filling and draining. It does not attack synthetic rubbers used for seals and gaskets in vacuum systems. It is non-irritant, non-toxic and environmentally non-polluting.

Ordering Information

Product Description	Order No.
AP201 vapor booster pump fluid	
4 liters	H02601054
20 liters	H02601052
200 liters	H02601050

Silicone DC702, DC704EU and DC705 Diffusion Pump Fluids

These synthetic fluids are organo-silicon oxide polymers and have exceptional chemical stability both at high temperature and when in contact with most gases and vapors. They provide a range of general purpose fluids for ultimate vacuum from about 10⁻⁵ to 10⁻⁹ mbar, and are particularly useful in industrial processing applications due to their exceptional ruggedness. High throughputs of air, water vapor and corrosive gases can be pumped without fluid degradation. The fluids can withstand repeated admission of atmospheric air while at operating temperature and are widely used in valveless quick-cycle pumping processes. They have low toxicity and good resistance to gamma radiation.

Fluid breakdown products (due to bombardment and so on) tend to be electrically insulating and so we do not recommend these fluids for physical electronic applications such as mass spectrometers and surface analysis systems. The fluids are indifferent lubricants. Their decomposition is catalyzed by traces of alkali metals (for example, caesium) and their use should be avoided where possible.

Ordering Information

Product Description	Order No.		
	Europe	N. America	
Silicone 702			
500 ml	H02400007	H02400007	
1 US gal	N/A	H02400008	
5 kg (4673 ml)	H02400038	N/A	
Silicone 704EU			
500 ml	H11201040	H02400043	
1 US gal	N/A	H02400011	
5 kg (4673 ml)	H11201041	N/A	
Silicone 705	•		
500 ml	H02400027	H02400027	

Santovac® 5 Diffusion Pump Fluid

This synthetic fluid is a polyphenyl ether developed from fluids originally produced as lubricants for space vehicles. It has exceptionally low vapor pressure, exceptional thermal stability and a tendency to wet surfaces less readily and "creep" to a lesser extent than is common with most fluids. The fluid is employed for the cleanest high vacuum and ultra high vacuum applications down to less than 10⁻⁹ mbar (for example, electron microscopes, mass spectrometers and surface physics studies) where its excellent high vacuum performance and low tendency to migrate into the pump system particularly recommend it. The fluid is chemically stable, non-corrosive, safe and non-toxic at normal operating temperatures. Fluid breakdown products (due to bombardment and so forth) tend to be electrically conducting. Lubricating qualities are good and the fluid finds application to lubricate mechanisms in vacuum systems.

Product Description	Order No.
	Europe N. America
Santovac® 5 fluid	
100 ml	H11401001 H02300045
500 ml	H11401002 H02300046

Edwards L9 Diffusion Pump Fluid

Edwards L9 fluid has been developed for use in Diffstak and diffusion pumps. It is a naphthalene based synthetic material which is ideal for use in applications where silicones (which form insulating films) cannot be tolerated.

L9 fluid is rugged, has a very good vacuum performance and gives an ultimate pressure of typically 5×10^{-9} mbar (at 20 °C).

In addition, the fluid is chemically stable and is resistant to acids, alkalis, halogens and oxides of nitrogen. It does not react with common engineering metals or elastomers. It is immiscible to the common solvents alcohol, acetone and trichlorotrifluoroethane. The toxicity level of L9 is very low.

Safety note: When changing to this fluid the pump should be cleaned using a proprietary fluid. The pump should then be rinsed in acetone and dried prior to re-charging.

Ordering Information

Product Description	Order No.
Edwards L9 fluid 1 liter	H11501015

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Vapor Pump Fluid Selection Chart

			Silicone	T	Santovac [®] 5	L9
Apiezon [®]	AP201	702	704EU	705		
Mass Spectrometers	•				•	•
Electron Microscopes					•	•
Thin Film Sputtering					•	
Surface Studies					•	
UHV Systems				•	•	
Leak Detection					•	
TV Tubes		•	•			
Power Valves					•	•
Spaces Studies					•	
Furnaces	•					
Radioactive					•	
Vapor Booster	•					
Metallization		•	•			
ypical ultimate						
acuum achievable	_					
it 20 °C (mbar)	6.5 × 10 ⁻⁵	6.5×10^{-6}	6.5 × 10 ⁻⁸	1.3 × 10 ⁻⁹	1.3 × 10 ⁻⁹	5 × 10 ⁻⁹
/apor pressure		_	_			
mbar) at 20 °C	5 × 10 ⁻⁶	6.5×10^{-7}	1.3×10^{-8}	2.6 × 10 ⁻¹⁰	2.6 × 10 ⁻¹⁰	7.8 × 10 ⁻¹⁰
at 100 °C	2.4 × 10 ⁻²	1.3×10^{-3}	2.6 × 10 ⁻⁴	1.3 × 10 ⁻⁵	6.5 × 10 ⁻⁶	2.6 × 10 ⁻⁵
at 150 °C	6.5 × 10 ⁻¹	< 10 ⁻¹	1.3 × 10 ⁻²	< 10 ⁻³	4 × 10 ⁻⁴	2.3 × 10 ⁻³
Boiling temperature						
at 1.3 mbar (°C)						
approximate)	160	185	223	254	295	251
Molecular weight						
average)	310	530	484	546	446	407
/iscosity cSt at						
20 °C	34	55	47	240	2400	71.3
100 °C	5.0	4.9	4.3	7.9	12	5.6
150 °C	2.7	2.4	2.2	3.3	4.5	1.2
Pour point (°C)						
approximate)	-30	< -20	< -20	-10	+5	-5
Flash point (°C)	196	193	221	243	288	241
Fire point (°C)						
approximate)	204	275	275	275	350	281
Auto ignition point (°C)						
approximate)	305	500	500	500	590	370
Specific heat (cal/g/°C)	0.46	0.42	0.41	0.42	_	0.46
atent heat (cal/g)	69	40.9	52.7	51.6	49.2	42
Specific gravity at 25 °C	0.862	1.07	1.07	1.09	1.195	0.901
Coefficient of						
expansion per deg C	0.0007	0.0008	0.0008	0.0006	0.0008	0.00042
	(10 – 30 °C)	(25 – 50 °C)	(25 – 50 °C)	(25 – 50 °C)	(25 – 50 °C)	(25 – 50 °C)
Refractive index at						
oom temperature	1.476	1.516	1.557	1.579	1.6306	1.5154
					(25 °C)	(25 °C)
Energetic Particle						
Bombardment	conducting polymers formed	insu	llating polymers for	med	conducting po	lymers formed
Thermal Stability	poor		very good		excellent	good
Oxidation Resistance	Poor to fair		excellent		very good	good
Chemical Resistance	poor	very good b	out decomposed by	alkali metal	good	very good
Radiation Resistance	fair	, , ,	good		very good	fair

Recommended for this application



Silicone Grease

A high vacuum grade grease, which is for use at system pressures lower than 10^{-6} mbar.

Ordering Information

Product Description	Order No.
Silicone, high vacuum grease, tube 50 g	H02400036
Silicone, high vacuum grease, pack 5 kg	H11251015

Fomblin[®] Grease

This grease is an excellent lubricant for sliding elastomer seals, and exhibits the chemical inertness typical of the Fomblin[®] range.

It has a very low vapor pressure and is suitable for use in the presence of gaseous and liquid oxygen under severe conditions.

The general purpose AR555 grease offered by Edwards has the basic properties of Fomblin[®], but the vapor pressure is not specifically controlled. The vapor pressure is <10⁻⁷ mbar at 20 °C.

Ordering Information

Product Description	Order No.
Fomblin® vacuum grease AR555 grade, syringe 100	g H11350013

Krytox® Grease

DuPont Krytox[®] fluorinated greases are a family of multipurpose lubricants intended for use in speciality applications at elevated temperatures or in aggressive environments.

Ordering Information

Product Description	Order No.
	N. America
Krytox [®] 240AD, tube (57 g, 2 oz)	U30002525
Krytox® 240AD, tube (226 g, 8 oz)	U30002206
Krytox® 240AB, tube (57 g, 2 oz)	U30002536
Krytox® 240AB, tube (226 g, 8 oz)	U30002535
Krytox® 240AC, tube (57 g, 2 oz)	U30002538
Krytox® 240AC, tube (226 g, 8 oz)	U30002537
Krytox [®] LVP, tube (57 g, 2 oz)	U30002075
Krytox® LVP, tube (226 g, 8 oz)	U30002539
-	

Waxes and Sealing Compounds (Mineral Based)

Apiezon[®] wax W is a low vapor pressure wax for sealing joints in high vacuum systems. This wax softens at 80-90 °C and has a vapor pressure at 80 °C of 10^{-3} mbar and at 20 °C of 10^{-8} mbar.

Apiezon[®] wax W40 is similar to type W, but has a lower softening point which makes it very suitable for flow sealing in or around vacuum joints. It is not recommended for use at temperatures above 30 °C. It has a vapor pressure at 20 °C of 10⁻⁷ mbar.

Apiezon[®] sealing compound Q remains firm for temperatures up to 30 °C, but is sufficiently pliable to permit easy moulding into position. It is an excellent material for shielding or blanking off sections of apparatus. The compound is easily applied and can be readily removed. It has a vapor pressure at 20 °C of 10⁻⁴ mbar.

Ordering Information

Product Description		Order No.
Apiezon® W wax	20 x 25 g	H02301014
Apiezon [®] W wax	pack 1 kg	H11176007
Apiezon® W40 wax	pack 250 g	H02301015
Apiezon® Q sealing compound	tin 1 kg	H02300012

Apiezon[®] Greases

A range of Apiezon[®] greases is offered for use on high vacuum systems and for many general applications in the laboratory. These high purity greases are non-toxic, easy to apply, easy to clean off and have long shelf lives.

Applications include:

- Lubrication of glass and metal taps in vacuum systems
- Sealing polymer joints in vacuum systems
- Leak detection
- Protecting metal contacts in vacuum-encapsulated relays
- Sealing polished and ground glass/metal surfaces
- Optical surfaces in vacuum systems and laser systems does not cause clouding (L and M greases only)
- Non vacuum uses include lubrication of glass and metal taps in laboratory, medical and industrial applications
- Good "gettering" qualities (absorbs grease and chemical impurities) – ideal for electronics industry

Choice of grease depends largely on operating temperature (see below).

Anti Seize Greases

	AP100	AP101
Melting point	47 °C	>200 °C
Radiation resistant	No	No
Vapor pressure at 20 °C (mbar)	<10 ⁻¹⁰	<10 ⁻⁵
Approvals	Marconi Radar	Marconi Radar, NATO
Comments	High vacuum; good lubrication, resists alkali, acid and corrosive gas; easily removed by most solvents. Particularly good for polished/ ground glass joints.	Medium vacuum, heavy duty grease; wide temperature base, ideal for laboratory work.

Lubricant (unmodified)

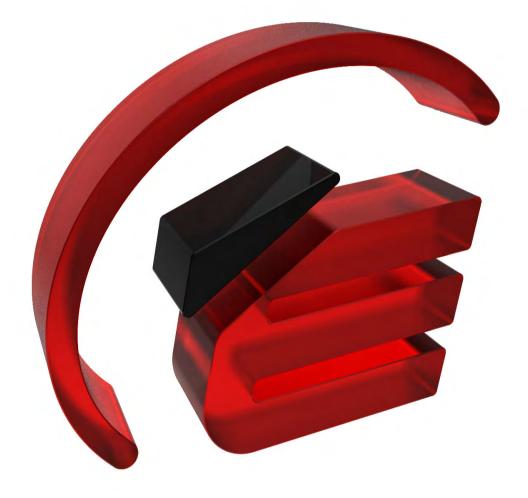
	L	М
Melting point	47 °C	44 °C
Radiation resistant	Yes	Yes
Vapor pressure at 20 °C (mbar)	<10 ⁻¹⁰	<10 ⁻¹⁰
Approvals	ESA, MatraMarconi, NASA, NATO	NATO
Comments	High vacuum, low temperature; nuclear, space industries; liquid gas chromatography	Similar to L grease, but stiffer; good gettering properties

Lubricant (polymers added)

	N	Т	н
Melting point	43 °C	125 °C	N/A*
Radiation resistant	No	No	No
Vapor pressure at 20 °C (mbar)	<10 ⁻⁹	<10 ⁻⁸	<10 ⁻⁷
Approvals	NASA, US Navy	NATO, US Navy	British Aerospace, ESA, Matra, Marconi, NASA
Comments	Rubbery, tenacious; cushions glass mating surfaces, ideal for burette taps. Cryogenic.	As N grease, but higher temperature; glass and general lubrication	Very high temperature; becomes stiffer as temperature increases

^{*} Grease H can withstand temperatures up to 250 °C without melting

Product Description	Order No.	
	Europe	N. America
Apiezon [®] L grease (50 g)	H02301041	H02301041
Apiezon [®] L grease (25 g)	N/A	H02301042
Apiezon [®] M grease (100 g)	H02301040	H02301040
Apiezon® M grease (25 g)	N/A	H11151002
Apiezon [®] N grease (25 g)	H02301011	H02301011
Apiezon® T grease (25 g)	H02301018	H02301018
Apiezon® AP100 grease (50 g)	H02300043	H02300043
Apiezon® AP101 grease (50 g)	H02301044	H02301044
Apiezon® AP101 grease (4 kg)	H02301045	H02301045
Apiezon® H grease (25 g)	H11150001	H11150001
Apiezon [®] J 500 ml	H11103016	H11103016
Apiezon [®] K 500 ml	H11104016	H11104016



Semiconductor Pumps







iH Dry Pumps	234
EPX on-tool High Vacuum Pumps	248
iGX Dry Pumps	264
GX Dry Pumps	270



Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

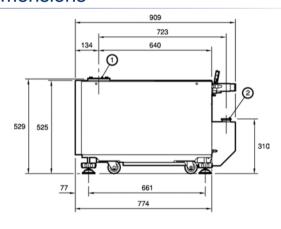
Features & Benefits

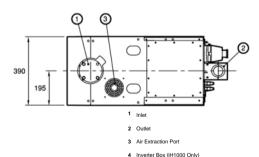
- · Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

Applications

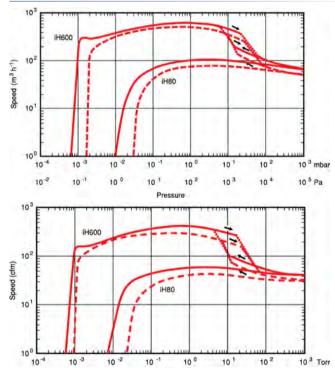
- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Dimensions





Performance Curves



7

7

Technical Data

Peak Speed	103 m h -1 61 cfm
Ultimate Vacuum	1717 I min ⁻¹ 1 x 10 ⁻² mbar 7.5 x 10 ⁻³ Torr
Typical shaft seal nitrogen flow	1 Pa 4 slm
Inlet Connection	ISO63
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	120 l h ⁻¹
	2 l min ⁻¹
Weight	240 kg
Power input at ultimate	2.7 kW
Rated motor power	3.5 kW
Oil Capacity	0.7

All figures are typical without gas ballast.

Product Description	Order No.
iH80 Dry Pump 460V, 60 Hz 3Ø	A59000908
iH80 Dry Pump 200/208V, 50/60 Hz 3Ø	A59000945
iH80 Dry Pump 380/415V, 50 Hz 3Ø	A59000946
iH80 Dry Pump 230V, 60 Hz 3Ø	A59000957



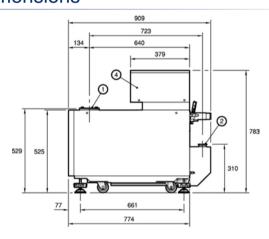
Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

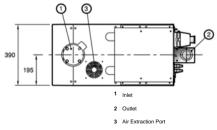
The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

Features & Benefits

- Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

Dimensions



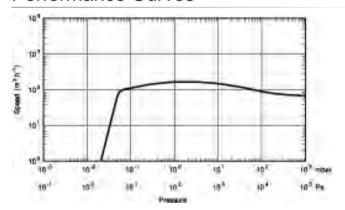


4 Inverter Box (iH1000 Only)

Applications

- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Performance Curves



7

7

Technical Data

Peak Speed	165 m ³ h ⁻¹ 97 cfm
Ultimate Vacuum	2750 l min ⁻¹ 1 x 10 ⁻² mbar 7.5 x 10 ⁻³ Torr 1 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO63
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	120 l h ⁻¹
	2 I min ⁻¹
Weight	244 kg
Power input at ultimate	3.1 kW
Rated motor power	5.0 kW
Oil Capacity	0.85 l

All figures are typical without gas ballast.

Product Description	Order No.
iH160 Dry Pump 460V, 60 Hz 3Ø	A59010908
iH160 Dry Pump 200/208V, 50/60 Hz 3Ø	A59010945
iH160 Dry Pump 380/415V, 50 Hz 3Ø	A59010946
iH160 Dry Pump 230V, 60 Hz 3Ø	A59010957



Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

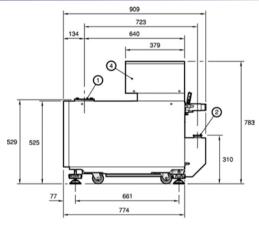
Features & Benefits

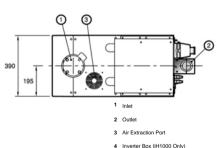
- · Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

Applications

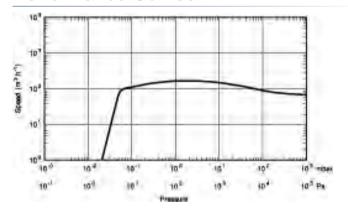
- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Dimensions





Performance Curves



7

7

Technical Data

Peak Speed	165 m h
	97 cfm
	2750 l min ⁻¹
Ultimate Vacuum	1 x 10 ⁻² mbar
	7.5 x 10 ⁻³ Torr
	1 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO63
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	120 l h ⁻¹
	2 I min ⁻¹
Weight	244 kg
Power input at ultimate	3.1 kW
Rated motor power	5.0 kW
Oil Capacity	0.85 I

All figures are typical without gas ballast.

Product Description	Order No.
iH160HTX Dry Pump 460V, 60 Hz 3Ø	A59012908
iH160HTX Dry Pump 200/208V, 50/60 Hz 3Ø	A59012945
iH160HTX Dry Pump 380/415V, 50 Hz 3Ø	A59012946
iH160HTX Dry Pump 230V, 60 Hz 3Ø	A59012957

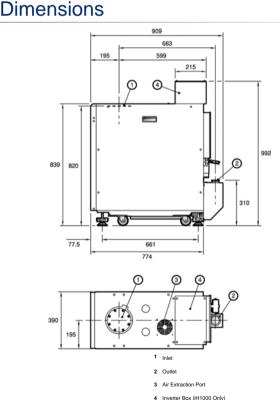


Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

Features & Benefits

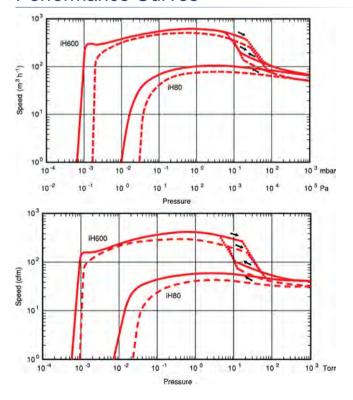
- Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.



Applications

- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Performance Curves



7

Technical Data

Peak Speed	600 m ³ h ⁻¹
	353 cfm
	10000 I min ⁻¹
Ultimate Vacuum	7 x 10 ⁻⁴ mbar
	5.3 x 10 ⁻⁴ Torr
	0.07 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO100
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	240 l h ⁻¹
	4 I min ⁻¹
Weight	415 kg
Power input at ultimate	3.4 kW
Rated motor power	6.1 kW
Oil Capacity	1.43

All figures are typical without gas ballast.

Ordering Information

Product Description	Order No.
iH600 Dry Pump 460V, 60 Hz 3Ø	A59020908
iH600 Dry Pump 200/208V, 50/60 Hz 3Ø	A59020945
iH600 Dry Pump 380/415V, 50 Hz 3Ø	A59020946
iH600 Dry Pump 230V, 60 Hz 3Ø	A59020957

7

Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

Features & Benefits

- · Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

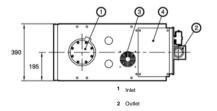
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Applications

- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

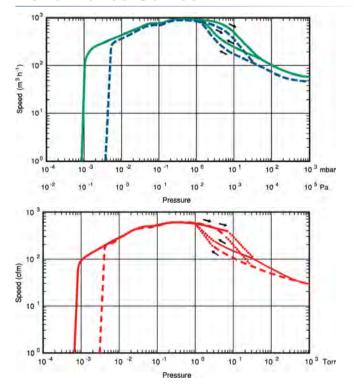
Dimensions

195 599 215 310



4 Inverter Box (iH1000 Only)

Performance Curves



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Technical Data

Peak Speed	3, -1
reak Speed	1000 m ³ h ⁻¹
	589 cfm
	16670 I min ⁻¹
Ultimate Vacuum	1 x 10 ⁻³ mbar
	7.5 x 10 ⁻⁴ Torr
	0.1 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO100
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	240 l h ⁻¹
	4 l min ⁻¹
Weight	430 kg
Power input at ultimate	3.8 kW
Rated motor power	6.1 kW
Oil Capacity	1.48 l

All figures are typical without gas ballast.

Product Description	Order No.
iH1000 Dry Pump 460V, 60 Hz 3Ø	A59030908
iH1000 Dry Pump 200/208V, 50/60 Hz 3Ø	A59030945
iH1000 Dry Pump 380/415V, 50 Hz 3Ø	A59030946
iH1000 Dry Pump 230V, 60 Hz 3Ø	A59030957

Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH Series offers high reliability for difficult processes, such as PECVD and LPCVD, where particulate, condensable and corrosive by-products are present.

Features & Benefits

- · Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

Applications

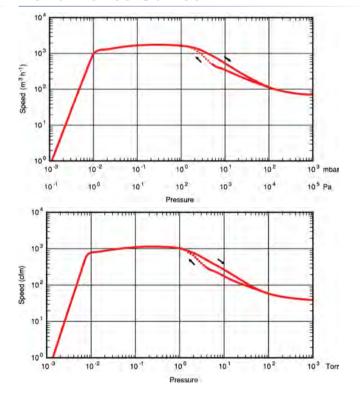
- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Dimensions

726 674 986 653 364 204 77.3 661 770 334 1 Inlet 2 Outlet

4 Inverter Box (iH1000 Only)

Performance Curves



7

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Technical Data

Peak Speed	1800 m ³ h ⁻¹
	1060 cfm
	30000 I min ⁻¹
Ultimate Vacuum	1 x 10 ⁻³ mbar
	7.5 x 10 ⁻⁴ Torr
	0.1 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO160
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	240 l h ⁻¹
	4 l min ⁻¹
Weight	502 kg
Power input at ultimate	4.1 kW
Rated motor power	7.0 kW
Oil Capacity	1.6 l

All figures are typical without gas ballast.

Product Description	Order No.
iH1800 Dry Pump 460V, 60 Hz 3Ø	A59040908
iH1800 Dry Pump 200/208V, 60 Hz 3Ø	A59040945
iH1800 Dry Pump 380/415V, 50 Hz 3Ø	A59040946
iH1800 Dry Pump 230V, 60 Hz 3Ø	A59040957
iH1800 Dry Pump 200/208V, 50/ Hz 3Ø	A59060945



Edwards advanced semiconductor vacuum pumps have been field-proven to perform to the highest operating standards. Reliability and high performance are achieved by extending service life, improving uptime and increasing productivity, while minimizing footprint and cost of ownership.

The iH1800HTX is specifically designed for processes such as 300 mm LPCVD Nitride, where higher operating temperatures are required to prevent process gas condensation.

Features & Benefits

- · Optimized utilities consumption.
- No preventative maintenance required.
- Cantilevered shafts and specially profiled rotors for better handling of particles.
- Reserve motor power also maximizes reliability on harsh-duty CVD applications.
- Corrosion resistant materials allow pumping of corrosive gases.

Applications

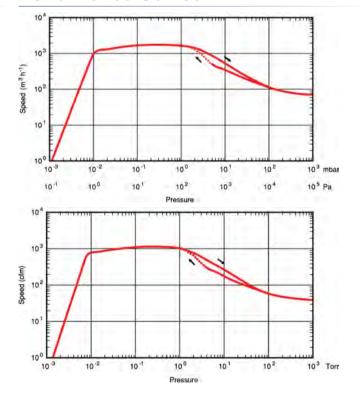
- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Dimensions

726 674 986 653 364 204 77.3 661 770 3 470 235 1 Inlet 2 Outlet

4 Inverter Box (iH1000 Only)

Performance Curves



7

7

Technical Data

Peak Speed	1800 m ³ h ⁻¹
	1060 cfm
	30000 I min ⁻¹
Ultimate Vacuum	1 x 10 ⁻³ mbar
	7.5 x 10 ⁻⁴ Torr
	0.1 Pa
Typical shaft seal nitrogen flow	4 slm
Inlet Connection	ISO160
Outlet Connection	NW40
Typical cooling water flow at 15 psi pressure drop	240 l h ⁻¹
	4 l min ⁻¹
Weight	502 kg
Power input at ultimate	4.1 kW
Rated motor power	7.0 kW
Oil Capacity	1.6 l

All figures are typical without gas ballast.

Product Description	Order No.
iH1800HTX Dry Pump 460V, 60 Hz 3Ø	A59042908
iH1800HTX Dry Pump 200/208V, 50/60 Hz 3Ø	A59042945
iH1800HTX Dry Pump 380/415V, 50 Hz 3Ø	A59042946
iH1800HTX Dry Pump 230V, 60 Hz 3Ø	A59042957
iH1800HTX Dry Pump 200/208V, 50/60 Hz 3Ø	A59062945

The new compact EPX180 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX180 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX180 offers outstanding performance in a package that is 20 lighter, 30 smaller and requires 40 less power than the IPX.

Features & Benefits

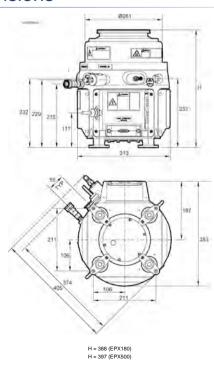
- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

Applications

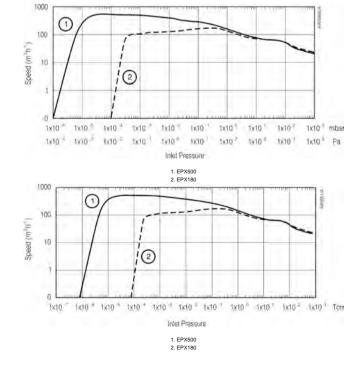
The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

The EPX 'L' Series has been designed for use clean duty applications pumping inert gas mixtures, such as loadlock, whereby control is provided by the process tool interface.

Dimensions



Performance Curves



Peak speed	170 m ³ h ⁻¹ 105 ft ³ min ⁻¹ 2835 I min ⁻¹
Ultimate vacuum	
	<1 x 10 ⁴ mbar
	<7.5 x 10 ⁻⁵ Torr
	<1 x 10 ⁻² Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO63
Outlet flange	NW25
Noise	<59 dB(A)
Water connectors	3/8 in Quick
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Electrical Supply	200/208 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	C3
Weight	43.5 kg

Product Description	Order No.
EPX180L Dry pump 400V, 3/8 Quick connects	A41941014
EPX180L Dry pump 208V C3 TIM 9/16 water connector	A41941132
EPX180L Dry pump 208V SPI TIM 3/8 water connector	A41941212
EPX180L Dry pump 208V SPI TIM 1/4 water connector	A41941222
EPX180L Dry pump 208V E73 TIM 3/8 water connector	A41941312
EPX180L Dry Pump 400V E73 TIM 3/8 water connectors	A41941314
EPX180L Dry pump 208V TEL TIM 3/8 water connector	A41941412
EPX180L Dry Pump 400V LAM TIM 3/8 water connectors	A41941514
EPX180L Dry Pump 208V MCM TIM 3/8 water connector	A41941712
EPX180L Dry pump 400V, 3/8 Water connectors	A41941014
EPX180L Dry pump 200V	A41941002
EPX180L Dry pump 200V, 3/8 water connector	A41941012
EPX180L Dry pump 208V C3 TIM 3/8 water connector	A41941112
EPX180L Dry pump 400V 1/4 water connector	A41941024
EPX180L Dry pump 208V C3 TIM 3/8 water connector	A41941142
EPX180L Dry pump 208V C3 TIM 3/8 water connector	A41941152
EPX180L Dry pump 400V SPI TIM 3/8 water connector	A41941214



The new compact EPX180 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX180 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX180 offers outstanding performance in a package that is 20 lighter, 30 smaller and requires 40 less power than the IPX

The EPX LE series of pumps has an End User Controller (EUC). The End User Controller enables

Features & Benefits

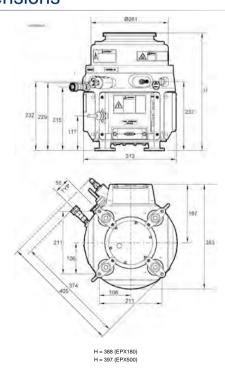
- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

Applications

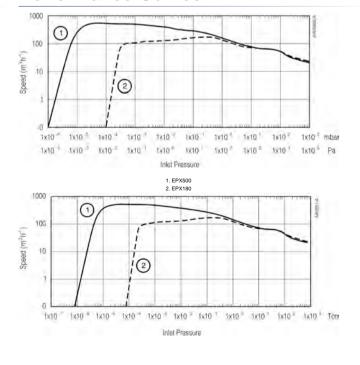
The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

The EPX 'LE' Series has been designed for use clean duty applications pumping inert gas mixtures, such as loadlock, whereby control is provided by the process tool interface.

Dimensions



Performance Curves



Peak speed	170 m ³ h ⁻¹
	105 ft min -1
	2835 I min ⁻¹
Ultimate vacuum	
	<1 x 10 ⁴ mbar
	<7.5 x 10 ⁻⁵ Torr
	<1 x 10 ⁻² Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO63
Outlet flange	NW25
Noise	<59 dB(A)
Water connectors	3/8 in Quick
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Electrical Supply	200/208 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	None
Weight	43.5 kg

Product Description	Order No.
EPX180LE Dry Pump 208V No TIM 3/8 water connector	A41943012
EPX180LE Dry Pump 400V No TIM 3/8 water connectors	A41943014
EPX180LE Dry Pump 208V No TIM 1/4 water connector	A41943022
EPX180LE Dry Pump 400V No TIM 1/4 water connectors	A41943024
EPX180LE Dry Pump 208V C3 TIM 3/8 water connector	A41943112
EPX180LE Dry Pump 208V SPI TIM 3/8 water connector	A41943212
EPX180LE Dry Pump 208V SPI TIM 1/4 water connector	A41943222
EPX180LE Dry Pump 400V SPI TIM 1/4 water connectors	A41943224
EPX180LE Dry Pump 208V TEL TIM 3/8 water connector	A41943412
EPX180LE Dry Pump 208V Hitachi TIM 3/8 water connector	A41943612
EPX180LE Dry Pump 208V MCM TIM 3/8 water connector	A41943712
EPX180LE Dry Pump 400V MCM TIM 3/8 water connectors	A41943714
EPX180LE Dry Pump 208V MCM TIM 1/4 water connector	A41943722

The new compact EPX180 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX180 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX180 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

Features & Benefits

- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

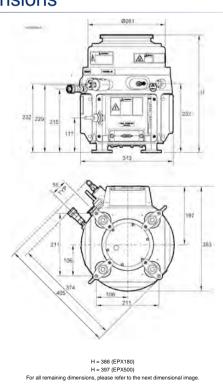
Applications

 The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

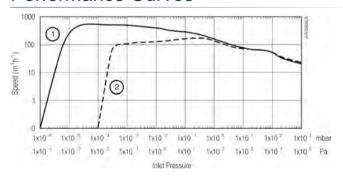
The EPX 'N' Series include a gas module that provides Nitrogen purge extending the application range to medium processes in which low levels of corrosive vapors and particulates are expected:

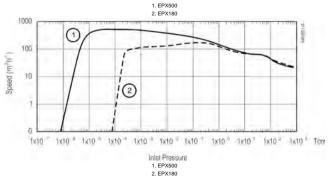
- Load Lock
- Transfer Chamber
- PVD sputtering
- Ashing/PR Strip

Dimensions

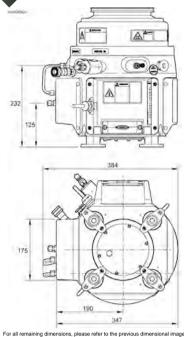


Performance Curves





7



Peak speed	170 m ³ - 1
	105 ft min -1
	2835 I min ⁻¹
Ultimate vacuum	
	<1 x 10 ⁻⁴ mbar
	<7.5 x 10 ⁻⁵ Torr
	<1 x 10 ⁻² Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO63
Outlet flange	NW25
Noise	<59 dB(A)
Water connectors	3/8 in Quick
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Nitrogen supply interface	1/4 in (6.5 mm) tube
Nitrogen supply pressure	$3 \times 10^5 - 7 \times 10^5$ pa
Minimum nitrogen purity	0.9995
Electrical Supply	200/208 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	C3
Weight	43.5 kg

Product Description Order No. EPX180N Dry pump 208V C3 TIM 3/8 water A41942112 connector EPX180N Dry pump 208V SPI TIM 3/8 water A41942212 connector EPX180N Dry pump 208V SPI TIM 1/4 water A41942222 connector EPX180N Dry pump 208V E73 TIM 3/8 water A41942312 connector EPX180N Dry pump 208V TEL TIM 3/8 water A41942412 EPX180N Dry pump 400V TEL TIM 3/8 water A41942414 connectors EPX180N Dry pump 208V MCM TIM 3/8 water A41942712 connector EPX180N Dry pump 400V MCM TIM 3/8 water A41942714 EPX180N Dry pump 400V, 3/8 water A41942014

Ordering Information

connector



The new compact EPX180 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX180 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX180 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

The EPX NE series of pumps has an End User Controller (EUC). The End User Controller enables local control for stand-alone use as well as the ability to connect to a fab-wide

Features & Benefits

- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

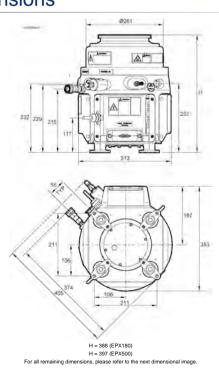
Applications

 The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

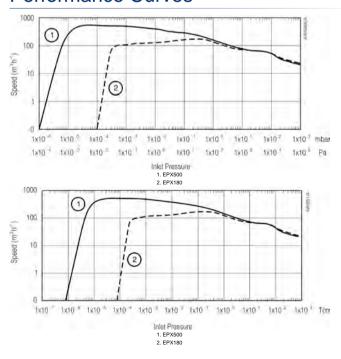
The EPX 'N' Series include a gas module that provides Nitrogen purge extending the application range to medium processes in which low levels of corrosive vapors and particulates are expected:

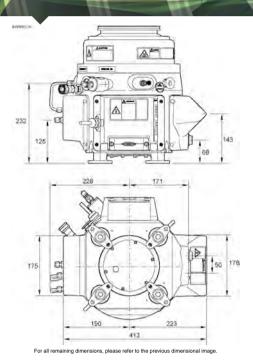
- Load Lock
- Transfer Chamber
- PVD sputtering
- Ashing/PR Strip

Dimensions



Performance Curves





Peak speed	170 m ³ h ⁻¹
	105 ft min -1
	2835 I min -1
Ultimate vacuum	
	<1 x 10 ⁻⁴ mbar
	<7.5 x 10 ⁻⁵ Torr
	<1 x 10 ⁻² Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO63
Outlet flange	NW25
Noise	<59 dB(A)
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Nitrogen supply interface	1/4 in (6.5 mm) tube
Nitrogen supply pressure	$3 \times 10^5 - 7 \times 10^5$ pa
Minimum nitrogen purity	0.9995
Electrical Supply	400 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	None
Weight	43.5 kg

Product Description	Order No.
EPX180NE Dry pump 400V No TIM 3/8 water connector	A41944014
EPX180NE Dry pump 208V SPI TIM 3/8 water connector	A41944212
EPX180NE Dry pump 400V SPI TIM 1/4 water connectors	A41944224
EPX180NE Dry pump 208V TEL TIM 3/8 water connector	A41944412
EPX180NE Dry pump 400V TEL TIM 3/8 water connectors	A41944414
EPX180NE Dry pump 400V TEL TIM 1/4 water connectors	A41944424
EPX180NE Dry pump 208V LAM TIM 3/8 water connector	A41944512
EPX180NE Dry pump 400V LAM TIM 3/8 water connectors	A41944514
EPX180NE Dry pump 208V MCM TIM 3/8 water connector	A41944712
EPX180NE Dry pump 400V MCM TIM 3/8 water connectors	A41944714
EPX180NE Dry pump 400V MCM TIM 1/4 water connectors	A41944724
EPX180NE Dry pump 208V No TIM 3/8 water connector	A41944012

The new compact EPX500 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX500 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX500 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

Features & Benefits

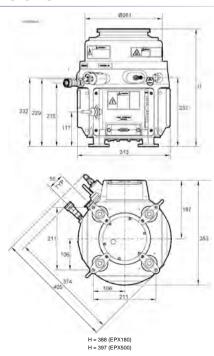
- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

Applications

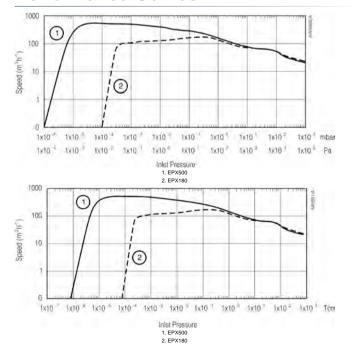
The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

The EPX 'L' Series has been designed for use clean duty applications pumping inert gas mixtures, such as loadlock, whereby control is provided by the process tool interface.

Dimensions



Performance Curves



7

Peak speed	500 m ³ h ⁻¹ 295 ft ³ min ⁻¹ 8338 I min ⁻¹
Ultimate vacuum	
	<1 x 10 ⁻⁶ mbar <7.5 x 10 ⁻⁷ Torr
	<1 x 10 ⁻⁴ Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO160
Outlet flange	NW25
Noise	<59 dB(A)
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Electrical Supply	200/208 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	C3
Weight	45.2 kg

Product Description	Order No.
EPX500L Dry Pump 208V SPI TIM 3/8 water connector	A41951212
EPX500L Dry Pump 400V SPI TIM 3/8 water connectors	A41951214
EPX500L Dry Pump 208V SPI TIM 1/4 water connector	A41951222
EPX500L Dry Pump 400V E73 TIM 3/8 water connectors	A41951314
EPX500L Dry pump 400V LAM TIM 3/8 water connectors	A41951514
EPX500L Dry Pump 400V MCM TIM No water connectors	A41951704
EPX500L Dry pump 208V MCM TIM 3/8 water connector	A41951712
EPX500L Dry pump 400V MCM TIM 3/8 water connectors	A41951714
EPX500L Dry Pump 208V C3 TIM 3/8 water connector	A41951112
EPX500L Dry Pump 200V	A41951002
EPX500L Dry Pump 400V	A41951004
EPX500L Dry Pump 400V SPI TIM 3/8 water connectors	A41951014

The new compact EPX500 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX500 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX500 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

The EPX LE series of pumps has an End User Controller (EUC). The End User Controller enables local control for stand-alone use as well as the ability to connect to a fab-wide

Features & Benefits

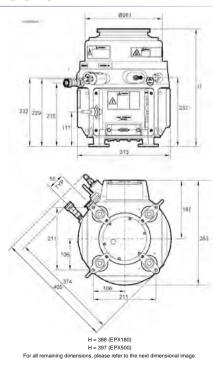
- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

Applications

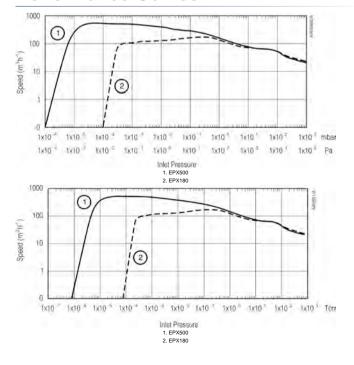
The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

The EPX 'LE' Series has been designed for use clean duty applications pumping inert gas mixtures, such as loadlock, whereby control is provided by the process tool interface.

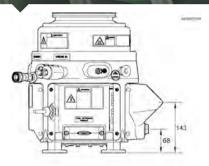
Dimensions

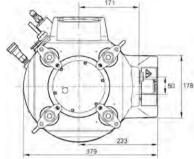


Performance Curves



7





Peak speed	500 m h -1
	295 ft ³ min -1
	8338 I min ⁻¹
1.114	

Ultimate vacuum

Noise

<1 x 10⁻⁶ mbar <7.5 x 10⁻⁷ Torr <1 x 10⁻⁴ Pa Warm-up time (to nominal performance) 30 min Inlet flange ISO160 NW25 Outlet flange <59 dB(A)

Minimum cooling water flow rate 2 I m⁻¹ Cooling water temperature 15 – 35 °C

200/208 V, 50/60 Hz 3 phase **Electrical Supply**

Power at ultimate 1.4 kW Rated motor power 3.0 kW TIM None Weight 45.2 kg

Product Description	Order No.
EPX500LE Dry pump 208V No TIM 3/8 water connector	A41953012
EPX500LE Dry pump 400V No TIM 3/8 water connectors	A41953014
EPX500LE Dry pump 208V E73 TIM 3/8 water connector	A41953312
EPX500LE Dry pump 208V TEL TIM 3/8 water connector	A41953412
EPX500LE Dry pump 208V MCM TIM 3/8 water connector	A41953712

The new compact EPX500 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX500 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX500 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

Features & Benefits

- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
- Low cost of ownership EPX requires only 1.4 kW of power and incorporating idle mode to maximize power efficiency.
- Unique patent protected pumping mechanism the EPX can pump down from atmosphere to turbomolecular base pressure and can operate continuously at all inlet pressures.
- Ultra clean mechanism conventional high vacuum bearings under grease use grease lubrication which can be a source of contamination in process tools. EPX pumps have no high vacuum bearings under grease and present no other source of potential contamination.
- Extremely reliable based on field proven IPX technology, the EPX has a MTBF_p = 13 years (SEMI E10) with service periods of around every 5 years to maximize the life of the pump.

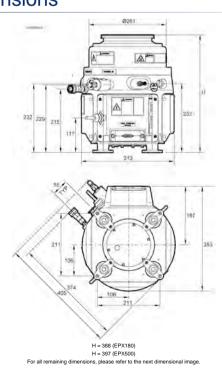
Applications

 The EPX series covers a broad range of applications from wafer handling through to medium duty processes.

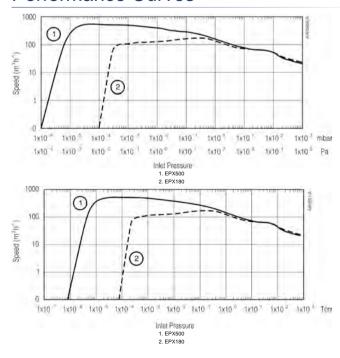
The EPX 'N' Series include a gas module that provides Nitrogen purge extending the application range to medium processes in which low levels of corrosive vapors and particulates are expected:

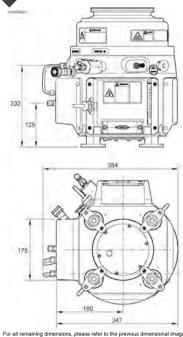
- Load Lock
- Transfer Chamber
- PVD sputtering
- Ashing/PR Strip

Dimensions



Performance Curves





Weight

Technical Data	
Peak speed	500 m ³ h ⁻¹
	295 ft min -1
	8338 I min ⁻¹
Ultimate vacuum	0000 1 111111
	<1 x 10 ⁻⁶ mbar
	<7.5 x 10 ⁻⁷ Torr
	<1 x 10 ⁻⁴ Pa
Warm-up time (to nominal performance)	30 min
Inlet flange	ISO160
Outlet flange	NW25
Noise	<59 dB(A)
Minimum cooling water flow rate	2 l m ⁻¹
Cooling water temperature	15 – 35 °C
Nitrogen supply interface	1/4 in (6.5 mm) tube
Nitrogen supply pressure	$3 \times 10^5 - 7 \times 10^5$ pa
Minimum nitrogen purity	0.9995
Electrical Supply	200/208 V, 50/60 Hz 3 phase
Power at ultimate	1.4 kW
Rated motor power	3.0 kW
TIM	C3

45.2 kg

Order No. **Product Description** EPX500N Dry pump 208V C3 TIM 3/8 water A41952112 connector EPX500N Dry pump 208V SPI TIM 3/8 water A41952212 connector EPX500N Dry pump 208V SPI TIM 1/4 water A41952222 connector EPX500N Dry pump 400V TEL TIM 3/8 water A41952414 connectors EPX500N Dry pump 208V TEL TIM 1/4 water A41952422 EPX500N Dry pump 208V MCM TIM 3/8 water A41952712 connector EPX500N Dry pump 400V, 3/8 water A41952014

Ordering Information

connector



The new compact EPX500 high vacuum drypump offers enhanced performance with reduced cost of ownership. Using a unique patent protected mechanism the EPX500 is capable of pumping from atmosphere to ultimate pressures of <7 x 10⁻⁵ Torr.

Based on the successful award winning IPX range, the modular EPX500 offers outstanding performance in a package that is 20% lighter, 30% smaller and requires 40% less power than the IPX.

The EPX NE series of pumps has an End User Controller (EUC). The End User Controller enables local control for stand-alone use as well as the ability to connect to a fab-wide

Features & Benefits

- Compact footprint as one of the smallest on-tool pumps available, the EPX offers outstanding savings in footprint. EPX can be mounted directly onto the tool saving foreline and installations costs or remotely if preferred.
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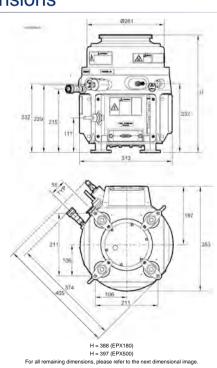
Applications

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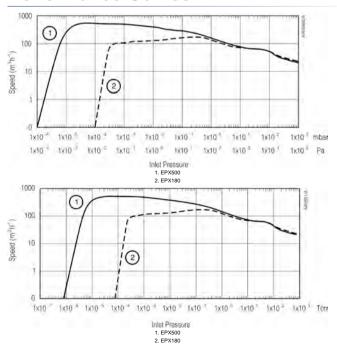
The EPX 'N' Series include a gas module that provides Nitrogen purge extending the application range to medium processes in which low levels of corrosive vapors and particulates are expected:

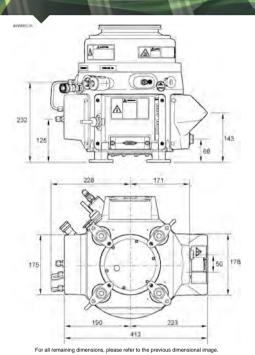
- Load Lock
- Transfer Chamber
- PVD sputtering
- Ashing/PR Strip

Dimensions



Performance Curves





Peak speed	500 m ³ h ⁻¹
	295 ft min -1

8338 I min⁻¹

<1 x 10⁻⁶ mbar Ultimate vacuum

<7.5 x 10⁻⁷ Torr <1 x 10⁻⁴ Pa

Warm-up time (to nominal 30 min

performance)

ISO160 Inlet flange Outlet flange NW25 <59 dB(A) Noise

2 l m⁻¹ Minimum cooling water flow rate 15 – 35 °C Cooling water temperature

Nitrogen supply interface 1/4 in (6.5 mm) tube Nitrogen supply pressure $3 \times 10^5 - 7 \times 10^5$ pa

Minimum nitrogen purity 0.9995

200/208 V, 50/60 Hz 3 phase **Electrical Supply**

1.4 kW Power at ultimate Rated motor power 3.0 kW None Weight 45.2 kg

Product Description	Order No.
EPX500NE 208V No TIM 3/8 water connector	A41954012
EPX500NE 400V No TIM 3/8 water connector	A41954014
EPX500NE 208V No TIM 1/4 water connector	A41954022
EPX500NE 208V SPI TIM 3/8 water connector	A41954212
EPX500NE 400V SPI TIM 1/4 water connectors	A41954224
EPX500NE 208V TEL TIM 3/8 water connector	A41954412
EPX500NE 400V TEL TIM 3/8 water connectors	A41954414
EPX500NE 400V TEL TIM 1/4 water connectors	A41954424
EPX500NE 208V LAM TIM 3/8 water connector	A41954512
EPX500NE 208V MCM TIM 3/8 water connector	A41954712
EPX500NE 400V MCM TIM 3/8 water connectors	A41954714

iGX100 Dry Pump



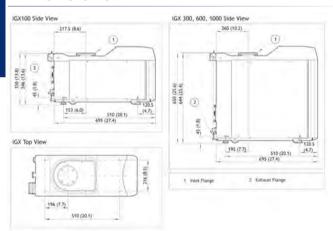
The iGX Dry Vacuum Pump Series sets new standards for zero maintenance between major overhauls. Improved efficiency lowers the cost of ownership and provides continuous pumping duty throughout the pressure range.

iGX drypumps include Ethernet connectivity allowing key data to be viewed via web pages, as well as a comprehensive set of networking options to assure continuous pump availability.

Features & Benefits

- · Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

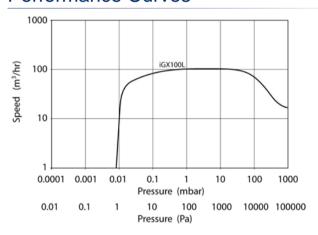
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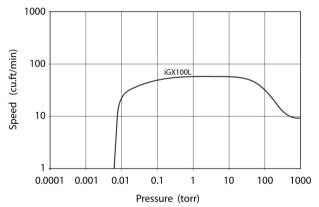


Applications

- Load Lock
- Transfer
- Metrology

Performance Curves





Peak speed	105 m ³ h ⁻¹ 62 cfm
Ultimate pressure	1750 I min ⁻¹ 5.00E ⁻⁰³ mbar 3.75E ⁻⁰³ Torr 0.50 Pa
Power at 700 Torr exhaust	
Ultimate	1 kW
AUC (Active Utility Controller)	0.05 kW
Water inlet*	1 slm
Nitrogen	0 slm
Footprint excluding exhaust	0.20 m ²
Weight	120 kg
Inlet connection	ISO63
Outlet connection	NW25
Noise at ultimate	< 55 dB(A)

^{*} Requires constant flow valve accessory.

Product Description	Order No.
iGX100L Dry pump 200-230V 50/60 Hz	A54610958
iGX100L Dry pump 380-460V 50/60 Hz	A54610959
iGX100MTI Dry pump 200-230V 50/60 Hz	A54648958
iGX100N Dry pump 200-230V 50/60 Hz	A54611958
iGX100N Dry pump 380-460V 50/60 Hz	A54611959
iGX100M Dry pump 200-230V 50/60 Hz	A54612958
iGX100M Dry pump 380-460V 50/60 Hz	A54612959

iGX600 Dry Pump



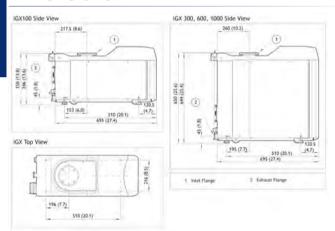
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Features & Benefits

- · Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

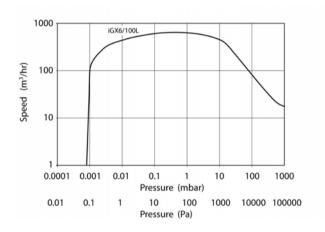
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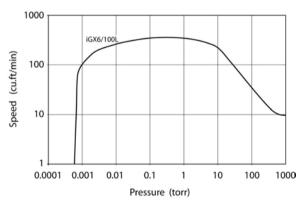


Applications

- Load Lock
- Transfer
- Metrology

Performance Curves





7

Peak speed	620 m ³ h ⁻¹ 365 cfm
Ultimate pressure	10333 I min ⁻¹ 7.00E ⁻⁰⁴ mbar 5.25E ⁻⁰⁴ Torr 0.07 Pa
Power at 700 Torr exhaust	
Ultimate	1.6 kW
AUC (Active Utility Controller)	0.05 kW
Water inlet*	2 slm
Nitrogen	0 slm
Footprint excluding exhaust	0.20 m ²
Weight	220 kg
Inlet connection	ISO100
Outlet connection	NW25
Noise at ultimate	< 55 dB(A)

^{*} Requires constant flow valve accessory.

Product Description	Order No.
iGX600L Dry pump 200-230V 50/60 Hz	A54630958
iGX600L Dry pump 380-460V 50/60 Hz	A54630959
iGX600N Dry pump 200-230V 50/60 Hz	A54631958
iGX600N Dry pump 380-460V 50/60 Hz	A54631959
iGX600M Dry pump 200-230V 50/60 Hz	A54632958
iGX600M Dry pump 380-460V 50/60 Hz	A54632959

iGX1000 Dry Pump



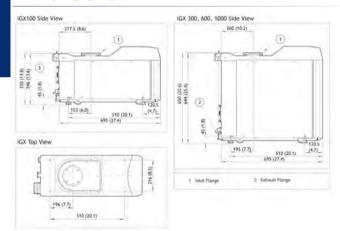
The iGX Dry Vacuum Pump Series sets new standards for zero maintenance between major overhauls. Improved efficiency lowers the cost of ownership and provides continuous pumping duty throughout the pressure range.

iGX drypumps include Ethernet connectivity allowing key data to be viewed via web pages, as well as a comprehensive set of networking options to assure continuous pump availability.

Features & Benefits

- · Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

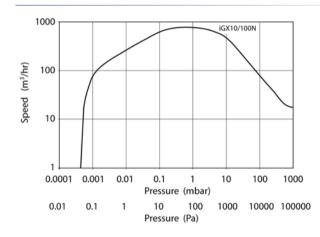
Dimensions

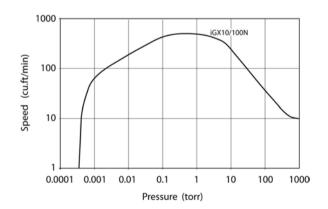


Applications

- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Performance Curves





7

7

Technical Data

Peak speed	800 m h
r can speca	800 m h

471 cfm

13333 I min⁻¹

1.00E⁻⁰³ mbar 7.50E⁻⁰⁴ Torr Ultimate pressure

0.10 Pa

Power at 700 Torr exhaust

Ultimate 1.6 kW AUC (Active Utility Controller) 1.05 kW Water inlet* 2 slm Nitrogen 4 or 14 slm 0.20 m^2 Footprint excluding exhaust 230 kg Weight ISO100 Inlet connection Outlet connection NW25 < 55 dB(A) Noise at ultimate

Product Description	Order No.
iGX1000N Dry pump 200-230V 50/60 Hz	A54681958
iGX1000N Dry pump 380-460V 50/60 Hz	A54681959

^{*} Requires constant flow valve accessory.

GX100 Dry Pump



The GX Dry Vacuum Pump Series sets new standards for zero maintenance between major overhauls. Improved efficiency lowers the cost of ownership and provides continuous pumping duty throughout the pressure range.

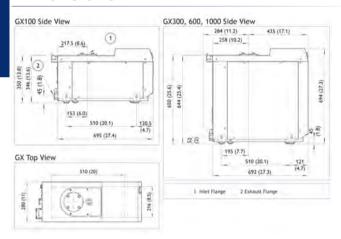
GX drypumps include Ethernet connectivity allowing key data to be viewed via web pages, as well as a comprehensive set of networking options to assure continuous pump availability.

GX pumps are available in a wide range of peak speeds and variants to address applications from clean through to medium-duty processes. A modular design allows users

Features & Benefits

- Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

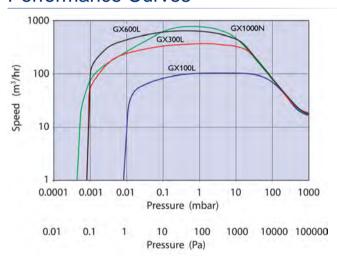
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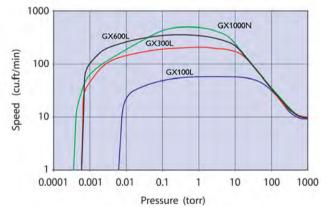


Applications

- Load Lock
- Transfer
- Metrology

Performance Curves





7

Performance	
Peak speed	105 m h -1
	62 ft min -1
	1750 l min ⁻¹
Ultimate pressure	5.00E ⁻⁰³ mbar
	3.75E ⁻⁰³ Torr
	0.50 Pa
Power at 700 Torr exhaust	
Ultimate	1.0 kW
AUC (Active Utility Controller)	0.05 kW
Water *	
Water inlet	1.0 slm
Nitrogen	0 slm
Installation Details	
Footprint (excluding exhaust)	0.20 m ²
Weight	120 kg
Inlet connection	ISO 63
Outlet connection	NW25
Noise at ultimate	<55 dB(A)

^{*} Requires Constant Flow Valve accessory

Product Description	Order No.
GX100L Dry Pump 200-230 V 50/60 Hz	A54710958
GX100L Dry Pump 380-460 V 50/60 Hz	A54710959
GX100TI Dry Pump 200-230 V 50/60 Hz	A54746958
GX100N Dry Pump 200-230 V 50/60 Hz	A54711958
GX100N Dry Pump 380-450 V 50/60 Hz	A54711959

GX600 Dry Pump



The GX Dry Vacuum Pump Series sets new standards for zero maintenance between major overhauls. Improved efficiency lowers the cost of ownership and provides continuous pumping duty throughout the pressure range.

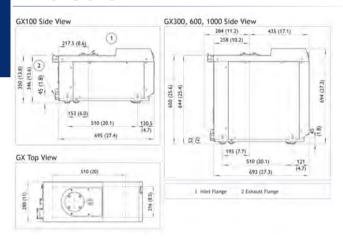
GX drypumps include Ethernet connectivity allowing key data to be viewed via web pages, as well as a comprehensive set of networking options to assure continuous pump availability.

GX pumps are available in a wide range of peak speeds and variants to address applications from clean through to medium-duty processes. A modular design allows users

Features & Benefits

- · Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

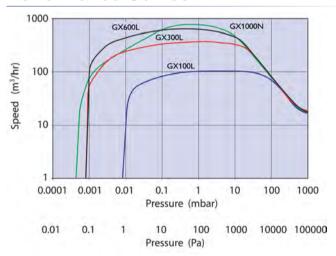
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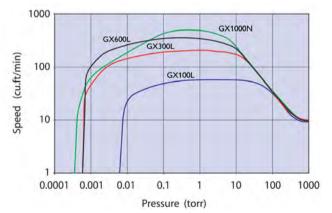


Applications

- Load Lock
- Transfer
- Metrology

Performance Curves





7

Performance	
Peak speed	620 m ³ h ⁻¹
	365 ft min -1
	10333 l min ⁻¹
Ultimate pressure	7.00E ⁻⁰⁴ mbar
	5.25E ⁻⁰⁴ Torr
	0.07 Pa
Power at 700 Torr exhaust	
Ultimate	1.6 kW
AUC (Active Utility Controller)	0.05 kW
Water *	
Water inlet	2.0 slm
Nitrogen	0 slm
Installation Details	
Footprint (excluding exhaust)	0.20 m ²
Weight	220 kg
Inlet connection	ISO 100
Outlet connection	NW25
Noise at ultimate	<55 dB(A)

^{*} Requires Constant Flow Valve accessory

Product Description	Order No.
GX600L Dry Pump 200-230 V 50/60 Hz	A54730958
GX600L Dry Pump 380-460 V 50/60 Hz	A54730959
GX600N Dry Pump 200-230 V 50/60 Hz	A54731958
GX600N Dry Pump 380-450 V 50/60 Hz	A54731959

GX1000 Dry Pump



The GX Dry Vacuum Pump Series sets new standards for zero maintenance between major overhauls. Improved efficiency lowers the cost of ownership and provides continuous pumping duty throughout the pressure range.

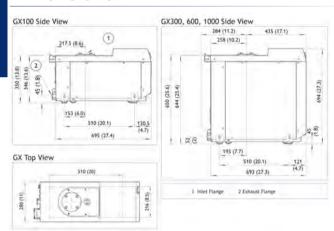
GX drypumps include Ethernet connectivity allowing key data to be viewed via web pages, as well as a comprehensive set of networking options to assure continuous pump availability.

GX pumps are available in a wide range of peak speeds and variants to address applications from clean through to medium-duty processes. A modular design allows users

Features & Benefits

- Reduced Cost of Ownership
- Up to a 50% reduction in utilities cost compared to iL/iH drypumps
- No preventative maintenance
- Flexible Installation Options
- Small and light for easy installation

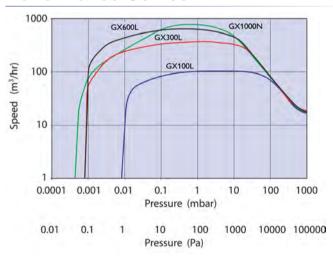
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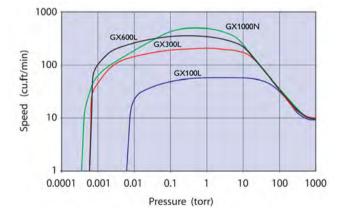


Applications

- Load Lock
- Transfer
- Metrology
- Lithography
- PVD Process

Performance Curves





7

7

Technical Data

Performance	
Peak speed	800 m ³ h ⁻¹

471 ft min -1 13333 I min⁻¹

1.00E⁻⁰³ mbar Ultimate pressure

7.50E⁻⁰⁴ Torr 0.10 Pa

Power at 700 Torr exhaust

Ultimate 1.6 kW AUC (Active Utility Controller) 1.05 kW

Water *

Water inlet 2.0 slm

Nitrogen 4 or 14 slm **

Installation Details

0.20 m² Footprint (excluding exhaust) Weight 230 kg ISO 100 Inlet connection Outlet connection NW25 <55 dB(A) Noise at ultimate

Product Description	Order No.
GX1000N Dry Pump 200-230 V 50/60 Hz	A54781958
GX1000N Dry Pump 380-460 V 50/60 Hz	A54781959

^{*} Requires Constant Flow Valve accessory
** Nitrogen purge can be manually adjusted to a maximum flow of
39slm

Exhaust Management for Semiconductor Processes

Comprehensive Range

Edwards is unique in offering the broadest range of exhaust management technologies, demonstrated in a series of products and systems designed to meet all customer requirements – from low-cost facility management to full environmental protection. We are committed to supplying exhaust management systems that match customer specific application requirements. We strive to minimize cost of ownership while introducing innovative designs to achieve greater reliability, longer service intervals, reduced space and utilities requirements and lower waste emissions.

Leading-Edge Manufacturing

Our primary manufacturing facility is located at Clevedon in the UK. The site comprises a factory with flexible production lines, assembly feed cells, just-in-time manufacturing techniques and one of the largest exhaust management research centers in the world. Additional manufacturing sites located at Chunan (Korea) and Ina (Japan) complement the global production capability. Underpinning our whole operation is a commitment to quality and world class manufacturing standards. An ISO 9001 and ISO 14001 management system, supported by TQM and Kaizen methodologies, is at the core of the operation. Product certification to the relevant international standard is conducted by ITS, the independent external test house.

Thermal Processing

Effective exhaust management of CVD processes must be able to handle the deposition gases and the associated powders. The fluoride wastes from cleaning gases also require suitable treatment along with the global warming gases. Abatement systems must be able to comply with these requirements in one complete unit.

The TPU (Thermal Processing Unit) is the industry standard abatement system for CVD. One model is suitable for all CVD and many etch applications. Each inlet can be configured for high level abatement of all Global Warming PFC gases, F_2 or CIF_3 . The TPU can accommodate total input flows up to 280 slpm.

Where PFCs are not used, the TCS (Thermal Conditioning System) provides a cost-effective means of handling both hazardous fluoride waste and deposition gases.

The Helios is an advanced solution for the abatement of high hydrogen flows designed to handle both toxic and carrier gases from Low Pressure Epitaxy and MOCVD processes.

Atlas The Atlas range is the lastest addition to the inward fired combustor range available in TPU, TCS and Kronis variants, the range offers the same excellent performance with added benefits of reduced utilities and cost of ownership savings as standard.

The Kronis provides effective treatment for low k CVD process exhausts.

The HOx (Hot Oxidation System) offers an innovative electrical heated oxidation unit and the proven three-stage wet scrubber of the combustor product line, it combines superior performance for the abatement of CVD processes in facilities which do not have the ability to use fuel gas.



GRC technology has been used to abate the exhaust gas streams on a wide range of semiconductor applications. (Photograph courtesy of TI, Dallas, USA.)

Gas Reactor Columns

Edwards offers a range of low-cost, point-of-use dry abatement systems for semiconductor processing. Each system uses the unique hot bed reactor technology developed for the GRC (Gas Reactor Column) range. The Inline 250 is the highest performance of any dry abatement technology for etch exhausts. It provides treatment by chemical reaction to stable inert salts and treats the widest range of gases from halogens and acids to ${\rm CIF_3}$, ${\rm NF_3}$, ${\rm SF_6}$ and other halide etch compounds. The D150 Dual GRC provides dual-cartridge operation thus minimizing the cost of ownership with 100% uptime. The M150 Single GRC is a compact dry gas treatment system for removing hazardous etch and CVD emissions at the source, converting them into harmless solids within an easily changed and disposable cartridge.

Wet Scrubbers

Edwards new range of wet scrubbers provide exhaust management at minimal cost for preservation of assets and regulatory compliance. Tempest is a point of use wet scrubber suitable for the treatment of semiconductor process tool exhausts containing water-soluble and water-reactive gases such as HCl, Cl₂ and NH₃.

Pyrophoric Conditioning

For the removal of silane and pyrophoric gases to below lower explosion level (LEL) the PCS (Pyrophoric Conditioning System) offers an advanced solution. Specifically designed for the safe handling of silane, the PCS incorporates a unique particle handling system to keep ducts free from powders.

Integrated Vacuum and Exhaust Management Systems

Vacuum equipment and exhaust management devices are traditionally installed side-by-side, beneath the process tool. The Zenith range now offers a series of process-specific, fully integrated vacuum pump and exhaust management systems designed to safely handle the process exhausts from a wide range of applications. Enhanced safety, process tool compatibility, minimum footprint and reduced cost of ownership are key benefits derived from our unique approach, resulting in improved uptime, process efficiency and profitability.

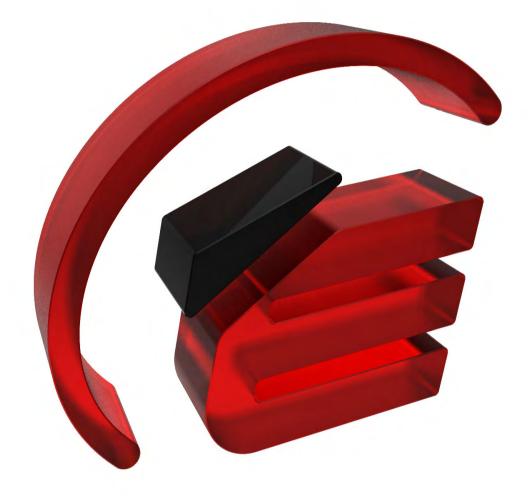
TMS Temperature Management System

Edwards offers TMS (Temperature Management System) for processes involving condensable byproducts. TMS ensures that these compounds remain volatile until they enter the abatement device. The TMS is designed to heat both forelines and pump exhaust lines to the inlet of the abatement device. Moulded high surface area heaters maximize contact with pipes and are designed to maintain the temperature of the pipe between 90° and 150 °C. TMS monitoring is available as an option to provide both local and remote verification that the line is at a sufficient temperature. TMS has been successfully used in conjunction with the entire range of Edwards exhaust management equipment to alleviate the problems historically associated with solid deposition and corrosion.

Product Selection

Using our product selection guide customers have the opportunity to decide which Edwards point-of use abatement equipment is most suitable for their particular application on the basis of their exhaust gas management goals. Edwards will provide their experience and expertise to specify the exhaust management product for the chosen application.

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ISSUES					Exhaust blockages from condensing vapors Toxic and corrosive by-products	Flammable/incompatible gas mixtures	Very nigh use of global warming PFC gases Use of global warming PFCs, high quantities of fluorine	Flammabe/incompatible gas mixtures Liquid sources can condense	Very high use of global warming PFC gases	Use of global warming PFCs, high quantities of fluorine produced Flammable/incompatible das mixtures	Liquid sources can condense Use of global warming PFCs, high quantities of fluorine	produced Flammable/incompatible gas mixtures	Very high use of global warming PFC gases	Use of global warming PFCs high quantities of fluorine produced	Highly toxic/corrosive gas used	Flammable/incompatible gas mixtures Highly toxic/corrosive gases used		Highly toxic/liammable gases used	Highly toxic/corrosive incompatible gases used sequentially	Habit tovivit amedians	rigniy toxtoniarimable gases used				Ī			Pyrophoric and flammable gases used Corrosive gases used Solids management required	tal ass et protection		EPI ERIX III-V	GRC M150 GANCAT	
Product Selection Guide				Conductive – poly silicon C ₁₂ /HBr/ SF ₆ /CF ₄ /CHF ₃	Conductive – metal Cl ₂ /BCl ₃ /CF ₄ /CHF ₃	Silane-based oxide/nitride/ SiH ₄ /NH ₃ /N ₂ O/ PH ₃ /SiF ₄		TEOS based oxide/BPSG TEOS/TEB/TEP	with PFC clean	with Nr ₃ clean ow k CVD 3MS/4MS/TMCTS	·	Metalization – tungsten SiH . MVE. / H.		with NF ₃ clean	with CIF ₃ clean	Metalization – titanium TiCl ₄ /NH ₃ /ClF ₃ /Cl ₂	0	Polysilicon Sin4/PH3/AsH3 Clean step none		With CIF ₃ POVD Nitride HOD/DOS/NH-			Low pressure EPI H ₂ /DCS/PH ₃ /SiH ₄ / AsH ₃ /B ₂ H ₆ / GeH _{4/HCI}		nide		H ₂ /O ₂ /CF ₄ /Cl ₂ /HCl/He/SF ₆	SiH4/NH3/NF3/F2/SF ₆	health management A Health safety and capital asset protection	7.	CVD	Mistral	
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Industrial Pumps and Pumping Systems







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8

Large Pumps and Pumping Systems

Introduction

Edwards range of IDX and GV industrial dry pumps, oil sealed rotary pumps, oil sealed piston pumps and mechanical boosters are the most comprehensive available to the industrial user. Add our extensive range of accessories and the pumps can be configured for a wide range of applications. The pumps and accessories can be supplied either as individual components or as fully systemized, factory tested combinations.

The range consists of:

- IDX dry pumps
- GV Drystar[®] dry pumps
- EM oil sealed rotary vane pumps
- Stokes Microvac oil sealed piston pumps
- EV oil sealed rotary vane pumps
- EH, Stokes Vacuum 6" and HV booster pumps

IDX and GV/GVM Drystar® Series Dry Pumps





The Drystar® GV80 – 600M range is based on the well proven Edwards reverse claw mechanism reaching a peak speed of 560 $\rm m^3h^{-1}$ / 330 $\rm ft^3min^{-1}$. The reverse claw mechanism results in short gas paths within the operating mechanism, providing the ability to handle large amounts of dust and water vapor, when compared to oil sealed pumps, without deterioration of performance.

The IDX 1000 and 1300 use the latest double ended screw technology to provide a peak speed of up to 1300 m³h⁻¹ / 767 ft³min⁻¹. Many features are patented and as with the GV range are able to handle large amounts of dust and water vapor with little or no effect on performance.

- · Low cost of ownership in harsh conditions
- High reliability dry mechanism proven in 100,000 installations
- · Oil free mechanism reduced maintenance
- · Higher dust and water vapor tolerance
- Accessories to optimize pump performance to process variables
- Fast pump down with Edwards hydrokinetic drive booster pumps.

EM Oil Sealed Rotary Pumps



Edwards rugged two stage mechanical oil sealed pumps are available in sizes from 40 - 275 m³h⁻¹ / 30 - 206 ft³min⁻¹. They feature:

- · Advanced oil lubrication circuit
- High reliability
- · Accessories to match your application needs

Stokes Microvac Oil Sealed Rotary Piston Pumps



Stokes Microvac oil sealed piston pumps are available in sizes 255 - 1240 m³h⁻¹ / 150 - 728 ft³min⁻¹. They feature:

- · Proven rugged robust design
- · Internal oil piping to eliminate potential leaks
- Oil sight glass and flow indicator to provide easy monitoring of oil level and flow
- · O-ring sealed covers to eliminate potential oil leaks
- · Integral gas ballast valve

EV Oil Sealed Single Stage Rotary Vane Pumps



Oil sealed rotary vane pumps 20 to 630 m³h⁻¹ /11 to 360 ft³min⁻¹. Standard features include:

- Dual frequency, wide band motor operates in most countries worldwide
- Efficient mist filter for economical operation and environmental protection
- Integral anti suckback valve protected by fine mesh filter
- Gas ballast valve
- · High pumping speed at low pressure
- Ultimate vacuum better than 0.5 mbar
- Continuously rated at any pressure from atmosphere to ultimate
- Fine mesh inlet filter

The new EV range of vacuum pumps provides an economical solution for industrial applications where high ultimate vacuums are not required.

EH Mechanical Booster Pumps



The EH mechanical booster pumps feature the unique hydrokinetic drive, providing an efficient power transmission with benefits in economy, performance and compactness. The hydrokinetic drive provides the following features:

- Capacities for 250 to 4200 m³h⁻¹
- Pump down times cut by 50%, when compared with direct drive pumps
- No bypass lines or pressure switches required
- Reduced capital and operating costs
- · Air cooled motors
- · Quiet, minimum vibration

Stokes 6" Series Mechanical Booster Pumps



Stokes 6" series mechanical booster pumps are available in sizes $1020-5100 \text{ m}^3\text{h}^{-1}$ / $600-3000 \text{ ft}^3\text{min}^{-1}$. Features include:

- Rugged design for reliable and extended operation
- Simple maintenance features incorporated in design
- · Options of direct drive motors or bare shaft machines
- Options of 5 seal process isolation boosters for optimum protection from dust and particulate
- Options of by pass technology to reduce pump down time
- · Dynamically balanced impellers

HV8000 Industrial, ATEX and Explosion Proof Mechanical Booster Pumps



The Edwards HV8000 high vacuum mechanical booster has a nominal pumping speed of 7200 m³ h⁻¹ (4241 ft³ min⁻¹), at 50 Hz.

- Derived from the successful range of SN pressure blowers, the HV8000 booster is designed for arduous duty cycles and high power applications.
- Ideal for larger scale harsh industrial and chemical applications, HV boosters are available in Industrial, ATEX or Explosion Proof configurations.
- HV boosters may be ordered as either 'bareshaft' or with motor fitted. Variable frequency drives may be specified for greater versatility.
- HV boosters are available in vertical or horizontal gas flow configuration.
- · For long service life, the external shaft seal is water-cooled.
- Five bearing construction and rugged helical gears make for a very robust construction.

HV Mechanical Booster Pumps



The HV30000 direct drive mechanical booster has a pumping speed of up to $36000~\text{m}^3\text{h}^{-1}$ / $21204~\text{ft}^3\text{min}^{-1}$ at 60~Hz. The speed of the pump motor can be controlled by an inverter.

In addition, the pumps offer the following features:

- · Water cooled shaft seals and after cooler
- Fitted with thermal snap-switch, to protect the pump from over temperature
- Nitrogen purge inlet fitted as standard
- · Vertical flow, direct drive
- Control with inverter, or interlock with a pressure switch input.

Systemization

Edwards comprehensive range of pumps forms the basis for the manufacture of factory tested combination systems, with displacements from 310 m³h⁻¹ to 30000 m³h⁻¹ / 180 ft³min⁻¹ to 17700 ft³min⁻¹. With a wide and robust range of accessories to choose from, the pumping system can be optimized for your application. Edwards systemization service offers fully factory tested combinations with appropriate accessories.

8

IDX and GV/GVM Pumps

Edwards is a market leader in dry pump technology and has pioneered the use of dry vacuum in some of the harshest

The IDX uses the very latest in double ended screw pumping technology, whilst the GV and GVM ranges utilize a reverse claw mechanism, proven over more than 10 years and 100,000 installations worldwide. Both provide reliable and economical solutions to the demands of today's industrial processes.



The product range is available from 80 $\mathrm{m}^3\mathrm{hr}^{\text{-}1}$ / 47 $\mathrm{ft}^3\mathrm{min}^{\text{-}1}$ to $1300~m^3hr^{-1}$ / 766 ft^3min^{-1} with capacity expandable to 7000 m^3hr^{-1} / 4120 ft^3min^{-1} using directly mounted boosters and is ideal for backing large booster arrays or diffusion pumps.

Why Dry?

Dry Vacuum pumps - why not you? The competitive nature of today's business means changes are required to improve performance, lower costs, and provide optimal process solutions. The GV /IDX Dry pumping solution is the change from traditional oil sealed pumps to a proven technology for this industry. Edwards, a world leader in dry pump technology, has demonstrated the ability to provide a low-cost, custom tailored solution to your vacuum application. The benefits offered by the GV Dry/IDX Dry pumping solutions are:

- Maintenance
 - Low capital cost and minimal maintenance requirements lead to lowest cost of ownership
 - Extended periods between user intervention
 - Lower consumable costs
- Environmental
 - No oil disposal
 - No oil emissions into atmosphere
- Performance
 - Very stable pumping speed gives repeatability to processes
 - Continuous pumping at atmosphere
 - Ability to handle particulates
 - Dry eliminates back-streaming, thus protecting reactive alloys from contamination
 - Significantly higher capacity for water vapor pumping than traditional oil sealed pumps
- Safety
 - Unobtrusive noise levels
 - No unsightly oil spills
 - No hazardous oil vapors

Cost Effective Technology In addition to the elimination of the costs of handling effluent and frequent oils changes, the IDX and GV/GVM ranges are designed to be 'fit and forget' products. The IDX and GVM range incorporates oil lubricated bearings (GV are grease packed) and high performance seals, proven on the EH booster range, to provide extended service intervals.

The IDX utilize the latest double ended screw profile technology whilst the GV pumps are multi-stage claw pumps with the GVM range having an additional roots stage to enhance both pumping speed and ultimate pressure. All Edwards dry pumps are designed to minimize the amount of power they consume.

All Edwards dry pump ranges are ideally suited to:

- Metallurgy
 - Vacuum Induction Melting (VIM)
 - Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Electron beam welding
- Vacuum sintering
- Steel degassing · Heat treatment

 - Hardening
 - Plasma & LP nitriding
 - LP carburization
 - Vacuum brazing
- Coating
 - Roll coating
 - Glass coating
 - Optical filters & lenses
 - Vacuum metallizing
- Hard drive & CD mastering
- Solar cell production
- Drying
 - Transformers, capacitors & cables
 - Leather
 - Spices & fragrances
 - Nuclear industry
 - Chamber hogging

and many more.

With such a range of pumping speeds combinations and applications available, Edwards retains a comprehensive Applications Engineering capability and are able to offer a solutions package that includes:

- · Process design
- · Equipment specification and selection
- Safety and operating procedures
- Vacuum system and control integration
- · Commissioning advice

Solutions Engineering

The range and complexity of industrial applications means a 'one size fits all' policy does not result in system optimization. A detailed appreciation of the process, environmental and safety issues is required to tailor systems to match performance and process.

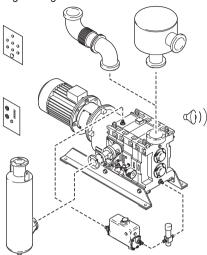
Applications Design & Support Edwards comprehensive design service is based on in-depth knowledge of the industries and applications involved. This expertise is held in the highly focused and experienced applications team, which consists of a Central Applications Group supported by a regional network of Applications Specialists. Proprietary software is used to define pumping requirements and a suite of optional accessories or modules are available. For larger or more unusual applications a custom engineering service is available.

Solutions could cover:

- · Process design
- · Equipment selection
- Safety and Operating Parameters
- Integration with plant control system(s)
- · Commissioning advice and more...

Contact your local office to request an initial discussion with an Applications Specialist. Typically, discussions will include gases / materials to be pumped, cycle times and duty pressures, system capacities, control systems, utilities, system footprint and all other aspects of the vacuum system to ensure that we are able to offer the most effective solution for your application.

Modular & Custom Accessories Accessory modules allow systems to be produced that address customer requirements without impacting on system lead times and allow a highly flexible approach to solutions engineering.



Accessory modules offered include:

Gas Purges Gas purge can be nitrogen, CDA (Clean Dry Air) or atmospheric air. They are used to protect seals, clean/blow through dust and particulates, cooling the gas load, etc. Options available are shown below and all are available with a control panel.

- · Shaft seal purge
- Gas ballast purge
- Exhaust purge
- · Atmospheric purge
- · High flow air purge (see filtration)

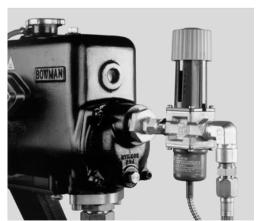
Utilities Control Panel Water and gas may be monitored and controlled by the addition of a gas panel. The panel also allows full integration with supervisory control systems.

GV/GVM Temperature Control The pumps are supplied as directly cooled as standard but, where poor quality cooling water is available or increased temperature control is required, an indirect cooling system can be specified. This module uses an external heat exchanger and an adjustable TCV (Temperature Control Valve) to set operating temperature. Options are:

- · Direct cooled -pump only
- · Direct cooled -pump and booster
- · Indirectly cooled -pump only
- · Indirectly cooled pump, directly cooled booster

All of the above options are available with a control panel.

 Air blast cooling may be specified and sized to suit the system heat load



IDX Temperature Control These pumps are supplied with indirect cooling as standard fitting.

Mechanical Boosters Addition of a booster provides increased pumping speed & improved ultimate. The GV and GVM ranges are available with EH hydro-kinetically driven boosters and Stokes 6" series direct drive mechanical boosters directly mounted onto the pump. The pumps are also suitable for backing larger boosters, such as Edwards HV range.

Boosters are available with:

- · Cooling options
- · Rotation & pressure sensors
- Variable speed drives
- · By-pass valve technology for shortened pump down times



Acoustics Silencers reduce pulsations in the exhaust and hence noise in the exhaust line.

They also act as a dust trap and can accumulate condensates. All silencers are drainable and for high dust loads, a cleanable unit is available. This allows the silencer to be cleaned without breaking the process line. Enclosures are lined by foam panels with absorbance frequencies that match the pumping system and reduce system noise by >5dB(A).

- Silencers stainless steel, drainable
- Silencer stainless or mild steel, cleanable and drainable
- Full system enclosures

Filtration Many industrial processes produce large quantities of dust of varying particle size that may also be wet, pyrophoric or corrosive. Edwards recommend that the main dust load is removed before the inlet of the pump and offer the following:

- · ITF filters for dry dust
- ITM filters for wet dust or backing diffusion pumps
- High flow air purge (700 mbar) to blow dust build up though the pump as required

Local Control Panels For all systems supplied by Edwards a range of control panels are available. They vary in sophistication and are designed to offer basic control through to complete plc-based control.



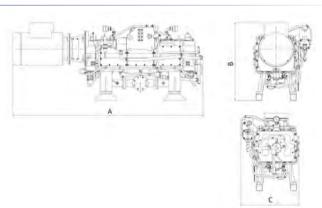
The IDX1000 is the new benchmark in performance for fast pumpdown of large chambers and high capacity pumping for industrial processes.

Based on the double-ended screw technology, the IDX Dry Vacuum Pump will give you all the reliability and performance you want for your process. The IDX outperforms all other dry pumps in robustness, performance and ease of operation, giving you faster pump-down from atmosphere and managing higher throughput at low pressures. Dry pumping systems reduce energy costs, eliminate effluent and can give significant improvements in product quality, making them the ideal solution for many coating and metallurgy processes.

Features & Benefits

- Improved Performance and Reliability
- Continuous performance from atmosphere to ultimate
- Excellent thermal profile and temperature control
- Tolerates liquid and particles
- Does not contaminate your process

Dimensions



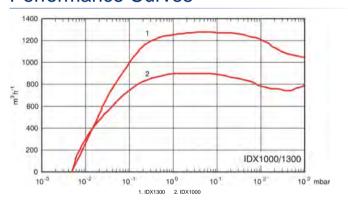
mension		IDX1000	IDX1300
Α	50Hz	2250 mm (88.5")	2465 mm (97")
	60Hz	2290 mm (90.1")	2515 mm (99")
В		854 mm (33.6")	1005 mm (39.6")

750 mm (29.5") 750 mm (29.5")

Applications

- Metallurgy
- Vacuum Induction Melting (VIM)
- Vacuum Arc Refining (VAR)
- Precision Investment Casting (PIC)
- Steel Degassing

Performance Curves



Technical Data

Mass	IDX1000	IDX1300
50 Hz	1560 kg (3439 lb)	1590 kg (3506 lb)
60 Hz	1630 kg (3594 lb)	1660 kg (3660 lb)
Pumping Speed		
Nominal	1000 m ³ hr ⁻¹ (589	1300 m ³ hr ⁻¹ (766
	cfm)	cfm)
Actual	900 m ³ hr ⁻¹ (560 cfm)	1250 m ³ hr ⁻¹ (736
	, ,	cfm)
Ultimate pressure	5×10^{-2} mbar (3.75 x	5 x 10 ⁻² mbar (3.75)
•	10 ⁻² Torr)	10 ⁻² Torr)
Noise	82 dB(A)	82 dB(A)
Motor	30 kW (40 hp)	30 kW (40 hp)
Optional	22 kW (30 hp)	

Order No.
A70904985
A70914985
A70803985
A70804985
A70813985
A70814985
Order No.
H11023011
H12810003

IDX Routine maintenance kit	A70801800
IDX Heat exchanger cleaning kit	A70801801
IDX Cooling system overhaul kit	A70801802
IDX Motor fitting kit	A70801803
IDX Drive coupling kit	A70801804
IDX Bearing and seal replacement kit	A70801805
IDX Oil pump replacement kit	A70801806
IDX Strip and rebuild kit	A70801807
IDX Flame arrestor cleaning kit	A70801808
IDX Hoses kit	A70801809
IDX Flame arrestor replacement kit (inlet)	A70801810
IDX Flame arrestor replacement kit (outlet)	A70801811
IDX Flame arrestor tooling kit	A70801812

Edwards have pioneered the use of dry vacuum pumps in some of the most harsh applications. With over 20 years experience and more than 100,000 Drystar pumps installed world-wide.

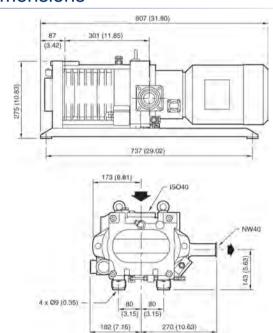
Our GV Drystar pumps are designed to handle large volumes of dust and water vapor without the risk of process contamination while maintaining high levels of repeatability, performance and reliability.

The GV80 Drystar pumps have a displacement of (91.5m³hr¹) and can be coupled with the Edwards EH series mechanical booster for increased pumping performance.

Features & Benefits

- · Robust ductile iron construction
- Repeatable pumping performance.
- · Ability to control pump temperature
- · Excellent dust and vapor handling capability
- Fit and forget performance.

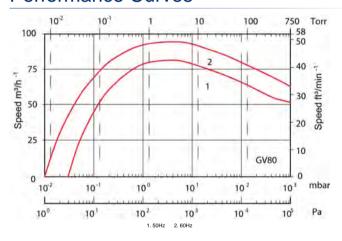
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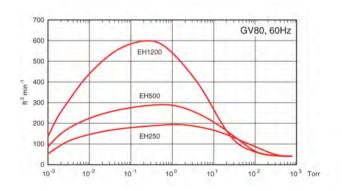


Applications

- Vacuum Induction Melting (VIM)
- Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Vacuum Coating
- Electron beam welding

Performance Curves





1. EH1200 60Hz 2. EH1200 50Hz

4. EH500 50Hz 5. EH250 60Hz

3. EH500 60Hz 6. EH250 50Hz

Ordering Information

Product Description	Order No.
GV80 Drystar 220-240/380/400/415V, 50Hz	A70212916
GV80 Drystar 230-460V 60 Hz	A70212995

Technical Data

Construction 3 claw + 1 roots

Displacement (swept volume) $91.5 \text{ m}^3 \text{h}^{-1} / 54 \text{ ft}^3 \text{min}^{-1}$ Pumping speed * $80 \text{ m}^3 \text{h}^{-1} / 47 \text{ ft}^3 \text{min}^{-1}$ Ultimate pressure <0.1 mbar / <0.08 TorrPower consumption at 10 3 Kw / 4 hp

Power consumption at 10 mbar/7.5 Torr

Motor Rating

4 kW / 5.4hp

Cooling-water flow at 20 °C 1 l min⁻¹ / 0.26 gal min⁻¹
Seal purge (dry air) <25 l min⁻¹ @ 0.4 bar

<0.75 ft min -1 @ 6 psig 78 dB(A)

Noise level 78 dB(A Inlet connection ISO40 Outlet connection NW40

Weight 145 kg / 319 lbs Gear box oil capacity 0.4 liter / 0.1 gal

Electrical supply 240V / 380V / 400V / 415V

^{*} Measured in accordance with Pneurop 6602 at 40 °C

GV160 Drystar



Edwards have pioneered the use of dry vacuum pumps in some of the most harsh applications. With over 20 years experience and more than 100,000 Drystar pumps installed world-wide.

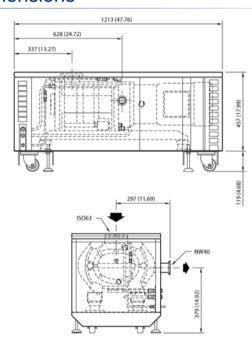
Our GV Drystar pumps are designed to handle large volumes of dust and water vapor without the risk of process contamination while maintaining high levels of repeatability, performance and reliability.

The GV160 Drystar pumps have a displacement of (200m³hr¹) and can be coupled with the Edwards EH series mechanical booster for increased pumping performance.

Features & Benefits

- · Robust ductile iron construction
- Repeatable pumping performance.
- Ability to control pump temperature
- · Excellent dust and vapor handling capability
- Fit and forget performance.

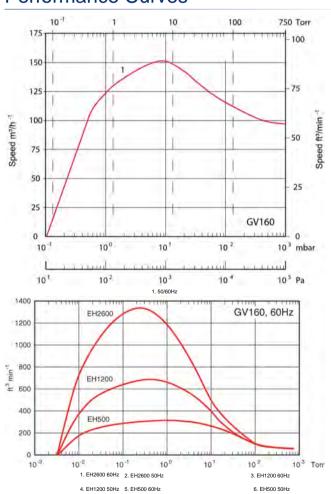
Dimensions



Applications

- Vacuum Induction Melting (VIM)
- Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Vacuum Coating
- Electron beam welding

Performance Curves



8

8

Technical Data

Motor Rating

Construction	2 claw + 1 roots
Displacement (swept volume)	200 m ³ h ⁻¹ / 118 ft ³ min ⁻²
Pumping speed *	180 m ³ h ⁻¹ / 106 ft ³ min ⁻¹
Ultimate pressure	<0.1 mbar / <0.08 Torr
Power consumption at 10	

Power consumption at 10 mbar/7.5 Torr 4.2 Kw / 5.7 hp

Cooling-water flow at 20 $^{\circ}$ C 1 l min $^{-1}$ / 0.45 gal min $^{-1}$ Seal purge (dry air) <30 l min $^{-1}$ @ 0.4 bar

<0.9 ft min -1 @ 6 psig

7.5 kW / 10 hp

Noise level <78 dB(A)
Inlet connection ISO63
Outlet connection NW40

Weight 230 kg / 506 lbs Gear box oil capacity 1.2 liter / 0.31 gal

Electrical supply 220-240/380-415V 50Hz 3ø

Product Description	Order No.
GV160 Drystar 220-240/380-415V 3ø 50 Hz	A70411916
GV160 Drystar 200V 3ø 50 Hz	A70411917
GV160 Drystar 200-208/380V 3ø 60 Hz	A70411934
GV160 Drystar 208-230/460V 3ø 60 Hz	A70411995

^{*} Measured in accordance with Pneurop 6602 at 40 °C



Edwards have pioneered the use of dry vacuum pumps in some of the most harsh applications. With over 20 years experience and more than 100,000 Drystar pumps installed world-wide.

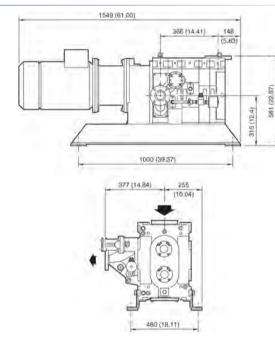
Our GV Drystar pumps are designed to handle large volumes of dust and water vapor without the risk of process contamination while maintaining high levels of repeatability, performance and reliability.

The GV160 Drystar pumps have a displacement of (341m³hr¹) and can be coupled with the Edwards EH series mechanical booster for increased pumping performance.

Features & Benefits

- Robust ductile iron construction
- Repeatable pumping performance.
- Ability to control pump temperature
- Excellent dust and vapor handling capability
- Fit and forget performance.

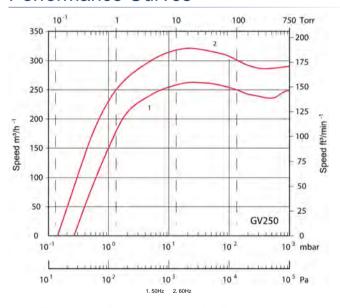
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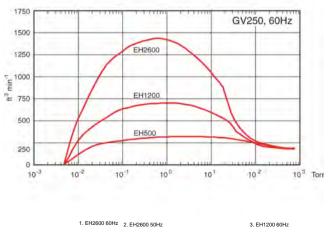


Applications

- Vacuum Induction Melting (VIM)
- Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Vacuum Coating
- Electron beam welding

Performance Curves





4. EH1200 50Hz 5. EH500 60Hz

6. EH500 50Hz

Ordering Information

Product Description	Order No.
GV250 Drystar 380/400/415V 3ø 50 Hz	A70561900
GV250 Drystar 230-460V 3-ph 60 Hz	A70561908

Technical Data

Noise level <79 dB(A)
Inlet connection ISO100
Outlet connection ISO63

Weight 750 kg / 1650 lbs Gear box oil capacity 1.5 liter / 0.4 gal

Electrical supply 380-400/400-415V 60 Hz 3ø

^{*} Measured in accordance with Pneurop 6602 at 40 °C

Edwards have pioneered the use of dry vacuum pumps in some of the most harsh applications. With over 20 years experience and more than 100,000 Drystar pumps installed world-wide.

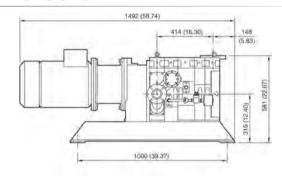
Our GV Drystar pumps are designed to handle large volumes of dust and water vapor without the risk of process contamination while maintaining high levels of repeatability, performance and reliability.

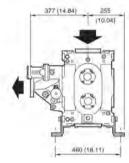
The GV400 Drystar pumps have a displacement of (425m³hr¹) and can be coupled with the Edwards EH series mechanical booster for increased pumping performance.

Features & Benefits

- · Robust ductile iron construction
- Repeatable pumping performance.
- · Ability to control pump temperature
- · Excellent dust and vapor handling capability
- Fit and forget performance.

Dimensions

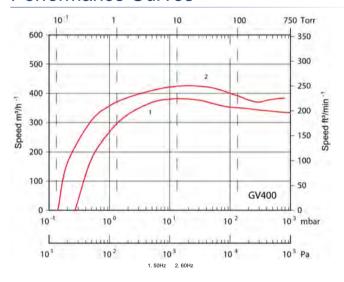


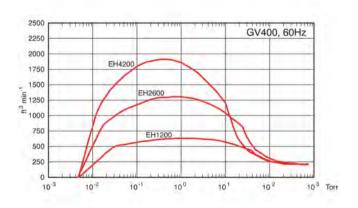


Applications

- Vacuum Induction Melting (VIM)
- Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Vacuum Coating
- Electron beam welding

Performance Curves





1. EH2600 60Hz 2. EH2600 50Hz

4. EH1200 50Hz 5. EH500 60Hz

3. EH1200 60Hz 6. EH500 50Hz

Construction	3 Claw
Displacement (swept volume)	540 m ³ h ⁻¹ / 318 ft ³ min ⁻¹
Pumping speed *	$380 \text{ m}^3 \text{h}^{-1} / 225 \text{ ft}^3 \text{min}^{-1}$
Ultimate pressure	<0.4 mbar / <0.3 Torr
Power consumption at 10mbar/ 7.5 Torr	7 kW / 9.4 hp
Motor rating	18 kW / 24.1 hp

 $\begin{array}{ll} \mbox{Motor rating} & \mbox{18 kW} \, / \, 24.1 \ \mbox{hp} \\ \mbox{Cooling water flow at 20°C} & \mbox{4 l min}^{-1} \, / \, 1.1 \ \mbox{gal min}^{-1} \\ \mbox{Seal purge (dry air)} & \mbox{<22 l min}^{-1} \ \mbox{@ 0.4 bar} \\ \mbox{<0.6 ft}^{-3} \mbox{min}^{-1} \ \mbox{@ 6 psig} \end{array}$

<0.6 ft min @ 82 dB(A)

Noise level82 dB(A)Inlet connectionISO100Outlet connectionISO63

Weight 820 kg / 1804 lbs Gear box oil capacity 1.5 liter / 0.4 gal

Electrical supply 380/400/415V 50 Hz 3 Ø

^{*} Measured in accordance with Pneurop 6602 at 40°C

Edwards have pioneered the use of dry vacuum pumps in some of the most harsh applications. With over 20 years experience and more than 100,000 Drystar pumps installed world-wide.

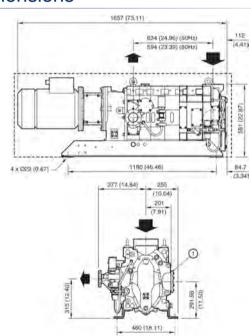
Our GV Drystar pumps are designed to handle large volumes of dust and water vapor without the risk of process contamination while maintaining high levels of repeatability, performance and reliability.

The GV600 Drystar pumps have a displacement of (793m³hr¹) and can be coupled with the Edwards EH series mechanical booster for increased pumping performance.

Features & Benefits

- · Robust ductile iron construction
- Repeatable pumping performance.
- · Ability to control pump temperature
- · Excellent dust and vapor handling capability
- Fit and forget performance.

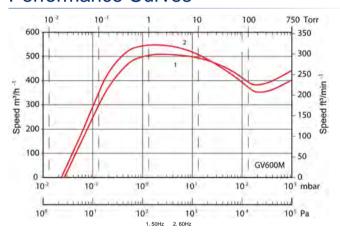
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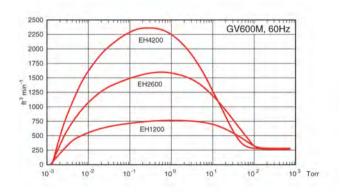


Applications

- Vacuum Induction Melting (VIM)
- Precision Investment Casting (PIC)
- Vacuum Arc Refining (VAR)
- Vacuum Coating
- Electron beam welding

Performance Curves





1. EH2600 60Hz 2. EH2600 50Hz

4. EH1200 50Hz 5. EH500 60Hz

3. EH1200 60Hz 6. EH500 50Hz

Construction 3 Claw + 1 roots 793 m³h⁻¹ / 467 ft³min⁻¹ Displacement (swept volume) 560 m³ h^{-1**} / 330 ft min^{-1**} Pumping speed * <0.05 mbar / <0.0375 Torr Ultimate pressure 7 Kw / 9 hp

Power consumption at 10mbar/ 7.5 Torr

22.5 Kw / 30 hp Motor rating

Cooling water flow at 20°C 5.5 l min⁻¹ / 1.43 gal min⁻¹ <22 l min⁻¹ @ 0.4 bar Seal purge (dry air)

<0.6 ft⁻³min⁻¹ @ 6 psig

Noise level 80 dB(A) ISO100 Inlet connection Outlet connection ISO63

Weight 950 kg / 2100 lbs Gear box oil capacity 1.6 liter / 0.42 gal 380/415V 50 Hz 3 Ø Electrical supply

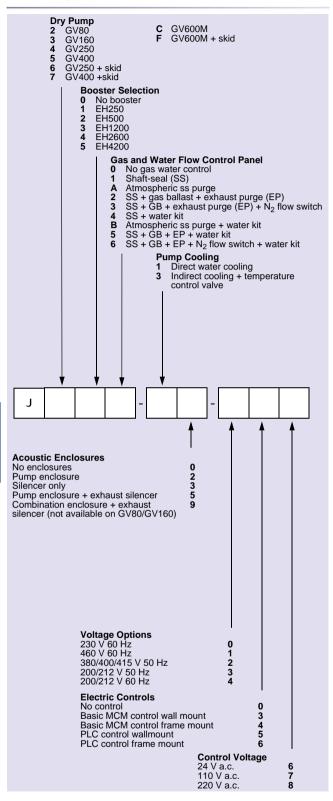
Ordering Information

Product Description	Order No.
GV600M Drystar 380-415V 50 Hz	A70574900
GV600M Drystar 230-460V 60 Hz	A70574908

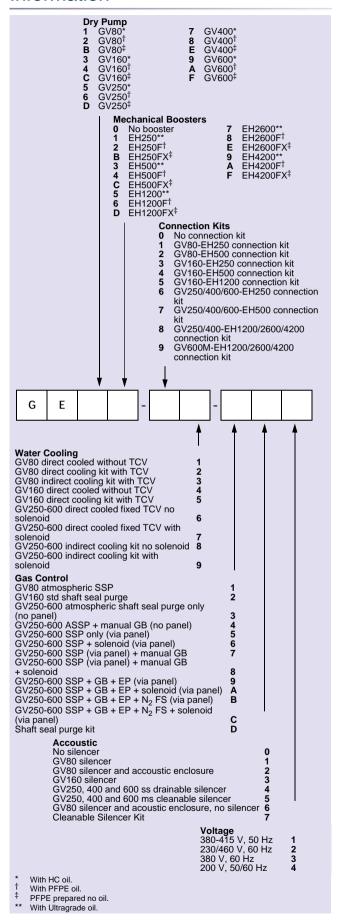
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^{*} Measured in accordance with Pneurop 6602 at 40°C ** GV600 @1 mbar

GV Dry Pump US Ordering Information



GV Dry Pump European Ordering Information



EM Oil Sealed Rotary Pumps



Edwards rugged two stage mechanical oil sealed pumps are available in sizes from 40 to 275 m³h⁻¹ / 30-206 ft³min⁻¹. They feature:

- · Advanced oil lubrication circuit
- · High reliability
- · Accessories to match your application needs

Application and Accessory Information EM Rotary Pumps

The use of Edwards rotary pumps with our comprehensive range of accessories will result in enhanced performance and reliability. The information below will help you to select the correct accessories for your application. However, we recommend that you treat this as a guide only, because the final selection of components can be influenced by the operation of your vacuum system and the process by-products. If in doubt, please contact Edwards or your local supplier for further advice from an Edwards application specialist.

When you select accessories for your system, the major aim is to prolong the life and the safe operation of the pumps and to ensure that the system continues to perform at its ultimate specification. To do this, you need to ensure that the system is able to accommodate the process media and any process by-products, including vapors, liquids or particulates, which may damage the pumps. At the same time, you should ensure that any materials discharged from the system to atmosphere are not harmful to the environment and to people nearby.

Broad Application Coverage

Industrial

Industrial EM primary pumps are annotated with the suffix "IND". EM primary pumps are safe to handle non-flammable gases and vapors within the normal operating parameters of the pump.

Flammable gases and vapors may also be pumped, provided they are outside the flammable range, please consult Edwards for advice.

PFPE

EM primary pumps may be supplied for use with PFPE oil. This enables them to be used in harsh (corrosive) processes, or where the presence of Oxygen will result in rapid degradation of hydrocarbon oils.

ATEX

- EM primary pumps (hydrocarbon oil only) may be supplied with ATEX classification either as part of a pump system or stand-alone.
 Please consult Edwards.
- ATEX compliance is typically specified for use in Europe, but may also be required in other areas.

ATEX compliant EM primary pumps are suitable for operation in ATEX systems rated as follows:

Pump Classification	Internal Classification	External Classification
E2M40 & E2M80		
E2M175 & E2M275		

Where the following classification...

Symbol	Meaning
(E)	Specifies that an ATEX-compliant EM pump can be used in a potentially explosive atmosphere
II	Equipment Group – II = non-mining equipment
3 (Int) 2 (Ext) G	Equipment Category 3 (or 2) – G = Gas
С	Constructional safety
IIB	Gas Group – Suitable to pump gases in gas group IIB Where no gas group is mentioned, there are no limitations
T4 T160 T3	Temperature Class – Gas auto-ignition temperature greater than: – T4 = 135 °C, T160 = 160 °C, T3 = 200 °C

A four-pole, three-phase ATEX approved flameproof motor provides direct drive through an ATEX certified flexible coupling to the E2M40, E2M80, E2M175 and E2M275 pumps. A cooling fan is attached to the drive coupling on the E2M40 and E2M80 pumps. The E2M175 and E2M275 pumps are water-cooled.

Lubrication is provided by a sliding vane oil pump, which delivers pressurized oil to the vacuum pumping mechanism.

Pumps are supplied with sealed Gas Ballast. Plugs have been fitted to prevent flammable atmospheres accidentally entering the pump. If the gas ballast facility is required, an N_2 purge must be used, or clean air supplied from a safe area.

For much of the operating cycle the pump operates at pressures significantly below 0.8 bar (11.6 psi) absolute. However, the final stage of the pump will exhaust to atmosphere and there is a startup and shutdown period where the whole pump is briefly operating at atmospheric pressure.

A surface temperature thermal snap switch is fitted to the body of the E2M175 and E2M275 rotary pumps. This must be connected to an intrinsically safe circuit suitable for the hazardous zone in which it may be located; otherwise it must be located in a safe area. If the pump temperature should rise due to a fault condition, the snap switch activates and the pump will shut-off.

Trapping Particulates

In any application, first ensure that particulates in the process stream are trapped before they get into the pump: use the ITM or ITF inlet filters which are suitable for use with oil-sealed and dry pumps. However, in processes which generate or contain large amounts of particulates, some will enter the pump: use our EOF an external oil filter to remove particulates from the pump oil during operation.

ITF inlet dust filters If the mechanical pump is a backing pump for a diffusion pump, the diffusion pump will trap particulates during normal operation, but the diffusion pump will not trap dust during the roughing stage of the process cycle. We recommend you fit an ITF filter to the mechanical pump inlet (that is, in the foreline): this filter has a replaceable element. Note that the impedance of a clean filter will cause the pumping speed to decrease by about 10% at 1 mbar and 20% at 10⁻² mbar. The ITF filter is more that 96% efficient, when tested in accordance with BS2831.

ITM High Capacity Inlet Dust Filters Use an ITM filter for applications where there is a high load of dust and particulates. Fit the ITM directly to the inlet of a rotary or mechanical booster pump. This filter has a stainless steel mesh element that can be washed and reused. It is ideal for use when backing diffusion pumps or for wet processes where a paper filter may become blocked quickly. The ITM filter has high conductance and is therefore ideal for applications which require fast pump down times. The ITM filter has an efficiency of 90%, when tested in accordance with BS3831.

EOF External Oil Filters Use the EOF's with the EM oil-sealed rotary pumps, to remove particulates trapped in the pump oil. There are two types of EOF filter.

The EOFA and EOFM filters use the internal pressurized oil system of the pump to continually filter a proportion of the pump oil. These filters are only suitable for hydrocarbon oil. The EOFM filter removes particulates down to 0.5 microns, and the EOFA filter both removes particulates and includes an active element to remove acidic and other aggressive contaminants from the oil.

EOF pumped external oil filters have their own oil re-circulation pump. The re-circulation pump has a high flow rate and allows large quantities of oil to be filtered. The filter is fitted with a gauge which indicates when the filter need to be changed. This filter is suitable for hydrocarbon and PFPE oils.

Pumping Vapors

The use of gas ballast significantly improves vapor handling capability of oil sealed rotary pumps. We offer a number of accessories to improve the utility of gas ballast.

EBV Gas Ballast Control Valve Fit EBV gas ballast control valve to allow remote or automated control of gas ballast.

TCV Temperature Control Valve The vapor pumping performance of the larger oil sealed pumps can be enhanced by fitting a TCV. Use the TCV both to warm-up the pump faster (which reduces the amount of condensation in the pump) and to reduce water usage and cost. ITC Inlet Chemical Traps Fit an ITC trap to the inlet of the pump to protect against the aggressive process vapors that may corrode the pump or degrade the oil.

Trapping Liquids

The use of gas ballast allows an oil sealed pump to process significant quantities of vapor. However, oil sealed pumps can not pump liquid streams and it is important both to remove liquids before they reach the pump inlet and to prevent condensed liquids from flowing back into the pump outlet. The following accessories may be suitable for your application:

ITO Inlet Trap The ITO inlet trap is ideal for processes where there is a risk of liquids in the process entering the pump inlet. Fit the ITO trap to the pump inlet or elsewhere in the foreline.

CP Catchpot Process vapors passing through the pump may condense after the pump outlet, in the exhaust line. Fit a CP catchpot to the pump outlet to trap the condensates and prevent them flowing back into the pump.

Exhaust Management

You should aim to minimize the impact of gases and vapors which exhaust from the pump outlet. Edwards offers a range of exhaust management systems for the most exacting applications. However, for most straight-forward applications of oil sealed rotary pumps, we recommend that you fit an oil mist filter to the pump outlet to remove oil mist vapor. A mist filter is not required if you vent the exhaust gases remotely or pass them through exhaust scrubbing equipment. MF Oil Mist Filters The MF filters remove oil mist (vapor) from the process gases exhausted from the outlet of an oil sealed pump. The filters remove both odor and oil vapor and so prevent it from reaching the atmosphere and the workplace.

Back Migration

When operated at ultimate pressure for extended periods of time, any oil sealed pump allows oil vapor to back migrate into the process chamber. The back-migration of oil vapor could contaminate your process or your vacuum system.

ITC Inlet Chemical Trap Fit an ITC inlet chemical trap (filled with an alumina charge) to the pump inlet to trap oil vapor and to prevent back migration.

Applications

- · Refrigeration dehydration
- Brake line evacuation
- · TV aluminizers
- Vacuum metallurgy
- · Fluorescent light tube pumping
- · Thin film coating
- IT hard disc coating
- Vacuum distillation
- · Cryogenic vessel evacuation
- Transformer and cable dryingPharmaceutical freeze drying
- Space simulation
- Crystal growing
- Automotive
- · Chemical processing

E2M40 Two Stage Rotary Vacuum Pumps

Edwards E2M40 series two stage oil sealed rotary vane vacuum pumps are renowned for their high ultimate vacuum, rapid pumping speeds, quiet operation and ability to handle water vapour. These direct drive rotary vane pumps are inherently compact and vibration free, and with their finger-proof fan and coupling housings they offer excellent operator protection.

A comprehensive range of accessories is available to allow use on the widest variety of vacuum applications.



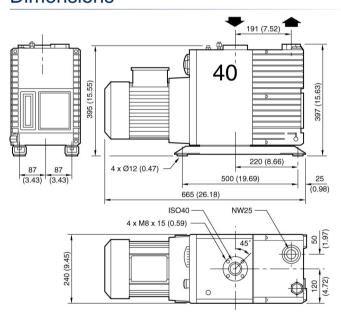
Features & Benefits

- Advanced pressurised oil circuit to give effective lubrication even under high gas loads
- When the pump is switched off, the spring loaded distributor valve provides oil and air suck-back protection
- Gas Ballast control to assist in handling high water vapour loads
- Industrial roller bearings on drive shaft for ultimate reliability and long, trouble free life
- Full height oil sight glass for easy checking of oil level and condition

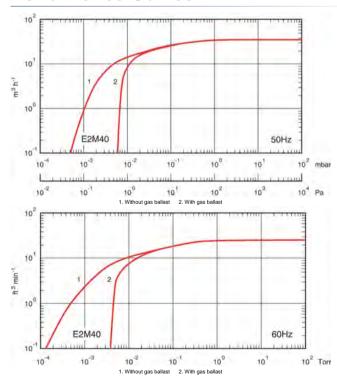
Applications

- Vacuum metallurgy processes
- Thin film coating technologies
- Pharmaceutical freeze drying
- Refrigeration and air conditioning system evacuation, drying, and backfilling
- Transformer and cable drying and impregnation, insulating oil treatment plant

Dimensions



Performance Curves



8

Maximum Minimum

Recommended oil

Noise level

Displacement	
50Hz	42.5 m ³ h ⁻¹ / 25 ft min ⁻¹
60Hz	50.5 m h 1 / 29.7 ft min 1
Speed (Pneurop)	
50Hz	37 m ³ h-1 / 21.8 ft ³ min ⁻¹
60Hz	44 m h-1 / 25.9 ft min -1
Number of stages	2
Ultimate vacuum (total pressure)	
Without gas ballast	$1.0 \times 10^{-3} \text{ mbar} / 7.7 \times 10^{-4} \text{ Torr}$
With gas ballast	$7.0 \times 10^{-3} \text{ mbar} / 5.4 \times 10^{-3} \text{ Torr}$
Inlet connection	ISO40
Outlet connection	25 mm flange suitable for NW25
Maximum outlet pressure	0.5 bar gauge
Maximum inlet pressure for water vapor	$0.2 \text{ kg h}^{-1} / 0.4 \text{ lb h}^{-1}$
Weight	72 kg / 159 lb
Motor protection rating	IP44 or IP54
Motor power	
50Hz	1.1 kW / 1.5 hp
60Hz	1.5 kW / 2 hp
Standard oil capacity	
maximum	3.5 liter / 3.2 qt
minimum	1.32 liter / 1.6 qt
PFPE oil capacity	

3.5 liter / 3.2 qt

1.32 liter / 1.6 qt

Ultragrade 70

65 dB (A)

Product Description	Order No.
E2M40 220-240 / 380-415V, 3-ph, 50Hz	A36401935
E2M40 208-230/460V, 3-ph, 60Hz	A36402982
E2M40T4 400V, 3-ph, 50Hz	A36418993
E2M40FX 220-240/380-415V, 3-ph, 50Hz	A36411935
E2M40FX 208-230/460V, 3-ph 60Hz	A36411982
Accessories & Spares	Order No.
Accessories & Spares Spares Kit C&O E1/2M40 HC/F	Order No. A34401131
Spares Kit C&O E1/2M40 HC/F	A34401131
Spares Kit C&O E1/2M40 HC/F Spares Kit Blade E1M40	A34401131 A34401050

E2M80 Two Stage Rotary Vacuum Pumps

Edwards E2M80 series two stage oil sealed rotary vane vacuum pumps are renowned for their high ultimate vacuum, rapid pumping speeds, quiet operation and ability to handle water vapour. These direct drive rotary vane pumps are inherently compact and vibration free, and with their finger-proof fan and coupling housings they offer excellent operator protection.

This pump is suitable for most duties and is safe to handle non-flammable gases and vapours within the normal operating parameters of the pump.



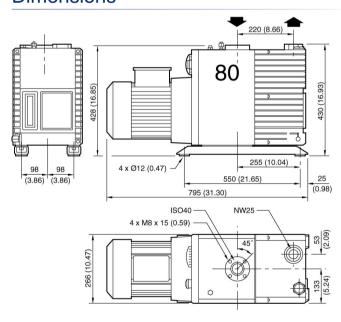
Features & Benefits

- Advanced pressurised oil circuit to give effective lubrication even under high gas loads
- When the pump is switched off, the spring loaded distributor valve provides oil and air suck-back protection
- Gas Ballast control to assist in handling high water vapour loads
- Industrial roller bearings on drive shaft for ultimate reliability and long, trouble free life
- Full height oil sight glass for easy checking of oil level and condition

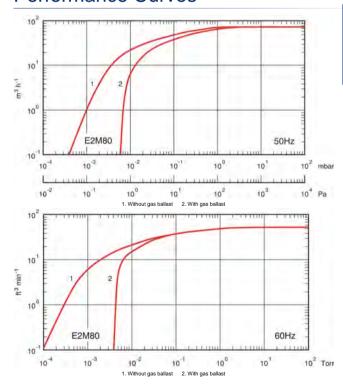
Applications

- Vacuum metallurgy processes
- Thin film coating technologies
- Pharmaceutical freeze drying
- Refrigeration and air conditioning system evacuation, drying, and backfilling
- Transformer and cable drying and impregnation, insulating oil treatment plant

Dimensions



Performance Curves



8

Displacement	
50Hz	80 m ³ h ⁻¹ / 47.1 ft ³ min ⁻¹
60Hz	96 m ³ h ⁻¹ / 56.5 ft ³ min ⁻¹
Speed (Pneurop)	
50Hz	74 m ³ h-1 / 43.6 ft ³ min ⁻¹
60Hz	90 m ³ h-1 / 53 ft ³ min ⁻¹
Number of stages	2
Ultimate vacuum (total pressure)	
Without gas ballast	$1.0 \times 10^{-3} \text{mbar} / 7.7 \times 10^{-4} \text{Torr}$
With gas ballast	$7.0 \times 10^{-3} \text{ mbar} / 5.4 \times 10^{-3} \text{ Torr}$
Inlet connection	ISO40
Outlet connection	25 mm flange suitable for NW25
Maximum outlet pressure	0.5 bar gauge
Maximum inlet pressure for water vapor	$0.3 \text{ kg h}^{-1} / 0.7 \text{ lb h}^{-1}$
Weight	105 kg / 231 lb
Motor protection rating	IP44 or IP54
Motor power	
50Hz	2.2 kW / 3 hp
60Hz	3 kW / 4 hp
Standard oil capacity	
maximum	6.3 liter / 6.7 qt
minimum	4 liter / 4.2 qt

Product Description	Order No.
E2M80 208-230/460V, 3-ph, 60Hz	A36502982
E2M80 220-240/380-415V, 3-ph, 50Hz	A36501935
E2M80T4 400V, 3-ph, 50Hz	A36518993
E2M80FX 220-240/380-415V, 3-ph, 50Hz	A36511935
E2M80FX, 208-230/460V, 3-ph, 60Hz	A36511982
Accessories & Spares	Order No.
Accessories & Spares Spares Kit C&O E1/2M80 HC/F	Order No. A34501131
Spares Kit C&O E1/2M80 HC/F	A34501131
Spares Kit C&O E1/2M80 HC/F Spares Kit Blade E2M80	A34501131 A36501050

E2M175 Two Stage Rotary Vacuum Pumps

Edwards E2M175 series two stage oil sealed rotary vane vacuum pumps are renowned for their high ultimate vacuum, rapid pumping speeds, quiet operation and ability to handle water vapour. These direct drive rotary vane pumps are inherently compact and vibration free, and with their finger-proof fan and coupling housings they offer excellent operator protection.

This pump is suitable for most duties and is safe to handle non-flammable gases and vapours within the normal operating parameters of the pump.



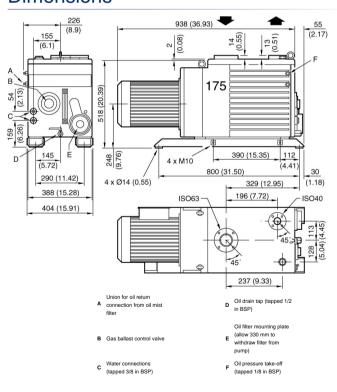
Features & Benefits

- Advanced pressurised oil circuit to give effective lubrication even under high gas loads
- When the pump is switched off, the spring loaded distributor valve provides oil and air suck-back protection
- Gas Ballast control to assist in handling high water vapour loads
- Industrial roller bearings on drive shaft for ultimate reliability and long, trouble free life
- Full height oil sight glass for easy checking of oil level and condition

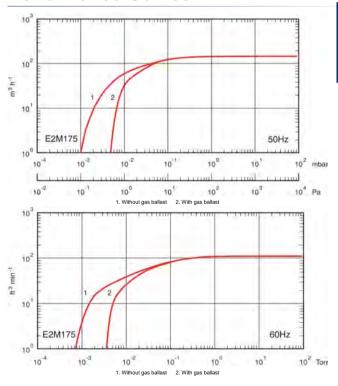
Applications

- Vacuum metallurgy processes
- Thin film coating technologies
- Pharmaceutical freeze drying
- Refrigeration and air conditioning system evacuation, drying, and backfilling
- Transformer and cable drying and impregnation, insulating oil treatment plant

Dimensions



Performance Curves



8

Displacement	
50Hz	178 m ³ h ⁻¹ / 105 ft min ⁻¹
60Hz	214 m ³ h ⁻¹ / 126 ft min ⁻¹
Speed (Pneurop)	
50Hz	160 m ³ h-1 / 94 ft ³ min ⁻¹
60Hz	196 m ³ h-1 / 115 ft ³ min ⁻¹
Number of stages	2
Ultimate vacuum (total pressure)	
Without gas ballast	$1.0 \times 10^{-3} \text{ mbar} / 7.7 \times 10^{-4} \text{ Torr}$
With gas ballast	$7.0 \times 10^{-3} \text{ mbar} / 5.4 \times 10^{-3} \text{ Torr}$
Inlet connection	ISO63 blank flange with seal
Outlet connection	ISO40 flange centre tapped
Maximum outlet pressure	0.5 bar gauge
Maximum inlet pressure for water vapor	20 mbar / 15 Torr
Maximum water vapor pumping rate	$0.3 \text{ kg h}^{-1} / 0.7 \text{ lb h}^{-1}$
Weight	200 kg / 441 lb
Motor protection rating	IP44
Motor power	
50Hz	5.5 kW / 7.5 hp
60Hz	6.5 kW / 8.5 hp
Standard oil capacity	
maximum	25 liter / 26 qt
minimum	16 liter / 17 qt
PFPE oil capacity	
Maximum	18 liter / 19 qt
Minimum	6.5 liter / 6.9 qt
Recommended oil	Ultragrade 70
Noise level	75 dB (A)

Product Description	Order No.
E2M175 220-240/380-415V, 3-ph, 50Hz	A36601935
E2M175 208-230/460V, 3-ph, 60Hz 4 pole	A36603982
E2M175T3 220-240/380-415V, 3-ph, 50Hz	A36618993
E2M175FX 220-240/380-415V, 3-ph, 50Hz	A36615935
E2M175FX 208-230/460V, 3-ph, 60Hz	A36616982
Accessories & Spares	Order No.
Spares Kit C&O E1M175/275S	A34601131
Spares Kit C&O E2M175/275	A36601131
Service Interior Assy E1M175	A34601100
Service Interior Assy E2M175	A36601100
Spares Kit Blade E2M175	A36601134
Spares Kit Blade Springless E1M175	A34601134
Spares Kit Major E1M175S	A34601831
Spares Kit Major Service E2M175	A36601831

E2M275 Two Stage Rotary Vacuum Pumps

Edwards E2M275 series two stage oil sealed rotary vane vacuum pumps are renowned for their high ultimate vacuum, rapid pumping speeds, quiet operation and ability to handle water vapour. These direct drive rotary vane pumps are inherently compact and vibration free, and with their finger-proof fan and coupling housings they offer excellent operator protection.

This pump is suitable for most duties and is safe to handle non-flammable gases and vapours within the normal operating parameters of the pump.



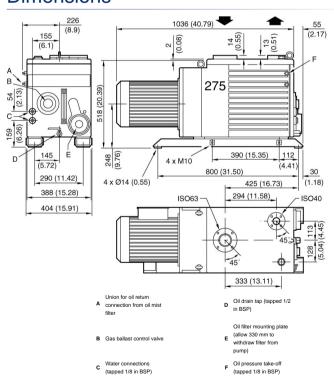
Features & Benefits

- Advanced pressurised oil circuit to give effective lubrication even under high gas loads
- When the pump is switched off, the spring loaded distributor valve provides oil and air suck-back protection
- Gas Ballast control to assist in handling high water vapour loads
- Industrial roller bearings on drive shaft for ultimate reliability and long, trouble free life
- Full height oil sight glass for easy checking of oil level and condition

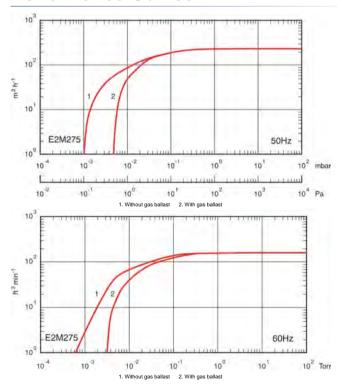
Applications

- Vacuum metallurgy processes
- Thin film coating technologies
- Pharmaceutical freeze drying
- Refrigeration and air conditioning system evacuation, drying, and backfilling
- Transformer and cable drying and impregnation, insulating oil treatment plant

Dimensions



Performance Curves



8

Displacement	
50Hz	292 m ³ h ⁻¹ / 172 ft min -1
60Hz	350 m ³ h ⁻¹ / 206 ft min ⁻¹
Speed (Pneurop)	
50Hz	255 m ³ h-1 / 150 ft ³ min ⁻¹
60Hz	306 m ³ h-1 / 180 ft ³ min ⁻¹
Number of stages	2
Ultimate vacuum (total pressure)	
Without gas ballast	$1.0 \times 10^{-3} \text{ mbar} / 7.7 \times 10^{-4} \text{ Torr}$
With gas ballast	5.0 x 10 ⁻³ mbar / 3.8 x 10 ⁻³ Torr
Inlet connection	ISO63 blank flange with seal
Outlet connection	ISO40 flange centre tapped
Maximum outlet pressure	0.5 bar gauge
Maximum inlet pressure for water vapor	12 mbar / 9 Torr
Maximum water vapor pumping rate	2.3 kg h ⁻¹ / 5.1 lb h ⁻¹
Weight	225 kg / 495 lb
Motor protection rating	IP44
Motor power	
50Hz	7.5 kW / 10 hp
60Hz	8.5 kW / 11 hp
Standard oil capacity	
maximum	28 liter / 29.5 qt
minimum	19 liter / 20 qt
PFPE oil capacity	
Maximum	18 liter / 19 qt
Minimum	7 liter / 7 qt
Recommended oil	Ultragrade 70
Noise level	75 dB (A)

Product Description	Order No.
E2M275 220-240/380-415V, 3-ph, 50Hz	A36701935
E2M275 208-230/460V, 3-ph, 60Hz	A36703982
E2M275T3 400V, 3-ph, 50Hz	A36718993
Accessories & Spares	Order No.
Spares Kit C&O E1M175/275S	A34601131
Spares Kit C&O E2M175/275	A36601131
Service Interior Assy E1M275	A34701100
Service Interior Assy E2M275	A36701100
Spares Kit Blade E2M275	A36701134
Spares Kit Blade Springless E1M275	A34701134
Spares Kit Major E1M275S	A34701831
Spares Kit Major Service E2M275	A36701831

Large Pump Accessories

MF Outlet Mist Filters

The MF30, MF100 and MF300 mist filters are suitable for pumps from E2M28 to E2M275. They are very efficient at 99.85% DOP test (pre-wetted filter; 99.5% with dry element). The oil level sight-glass provides easy monitoring of mist filter status.

The MF100AE is a version of the MF100, designed for use with corrosive gases and vapors and for greater security when processing toxic substances. It is very efficient at 99.1% DOP test (pre-wetted: 98.4% with dry element). This version is leak tested to 1×10^{-4} mbar I s⁻¹ / 3.8 x 10⁻³ Torr. The filter element, sight-glasses and seals are resistant to chemical attack. The MF100AE is fitted with an acrylic sight-glass (for use with fluorinated processes); a glass sight-glass is also supplied with the filter (for use with chlorinated

A version of the EMF clean application oil return kit is available for all the MF filters, except the MF100AE.

Ordering Information

Product Description	Order No.
Model MF100 mist filter (12 kg/26.5 lb)*	A46203000
Model MF100AE mist filter (12 kg/26.5 lb)*	A46211000
Model MF300 mist filter (28 kg/62 lb) [†]	A46204000

- Supplied with two NW25 "C" clamps, NW25 elbow, two NW25 centering ring and
- O-rings, bolts, washers, mounting brackets and studs
 Supplied with two ISO40 "C" clamps, ISO40 elbow, two 40 mm Co-Seals, bolts, washers, mounting brackets and studs

Accessories	Order No.
Clean application oil return kit (E1M40 to E2M80)	A50004000
Clean application oil return kit (E1M175 to E2M275)	A50005000
Spares	Order No.
MF100	A22304020
MF100AE	A22304052
MF300	A22304021
Spares kits	
MF100, MF100AE	A46203800
MF300	A46204800
MF100AE sight-glass kit	A50080000

CP Outlet Catchpots

In some industrial applications it is desirable for pumps to be provided with piped exhaust arrangements to carry gases and vapors to the outside of the building.

There is always a risk that some vapor carried out with the effluent gas will cool and condense as it travels up the exhaust line and the liquid produced will drain back into the pump causing serious

For this reason, it is good practice to use a catchpot between the pump outlet and the exhaust line to prevent this from happening.

These catchpots are designed for fitting directly to the pump outlet, or can be remotely mounted if required. A "high level" sight glass is provided to indicate the need for draining the catchpot when the nominal capacity is reached. A drain plug is also provided.

Note: When an oil mist filter is used, a separate catchpot is generally unnecessary.

Ordering Information

Product Description	Order No.
Model CP100 outlet catchpot,	A46103000
6.5 liter/6.2 qt capacity (12.0 kg/26.5 lb)*	
Model CP300 outlet catchpot,	A46104000
23.0 liter/22 qt capacity (28.0 kg/62 lb) [†]	

- Supplied with two NW25 "C" clamps, NW25 elbow, two NW25 centering rings and
- O-rings, bolts, washers, mounting bracket and studs.

 Supplied with two ISO40 "C" clamps, ISO40 elbow, two 40 mm O-rings and centering rings, bolts, washers, mounting brackets and studs.

External Oil Filters: EOF100A/300A (Chemical) and EOF100M/300M (Dust)

These filters are operated by the internal pressurized oil system of the pump, which by-passes a proportion of the oil through the filter. The filters are easy to install - just connect the flexible hoses supplied to the oil outlet and return connectors on the pump. The oil capacities are approximately 6 liters / 5.7 qt (EOF100) and 15 liters / 14.3 qt (EOF300).

The EOF100A and EOF300A chemical filters have a renewable highcapacity, activated earth element. The filters purify the oil by removing acidic and other aggressive contaminants. These filters are intended for use with hydrocarbon oils, and they will greatly increase the interval between oil changes.

The EOF100M and EOF300M dust filters have pleated paper elements which trap small dust particles (down to 0.5 micron diameter). Use these filters for applications which produce large quantities of abrasive dust (for example, vacuum furnaces).

Product Description	Order No.
External oil filter, without connection kit	
EOF100A	A50024000
EOF100M	A50025000
External oil filter, with E1M/E2M175 and 275 connection kit	
EOF300A	A50003000
EOF300M	A50023000
Connection kit for E1M/E2M40 and E1M/E2M80	
EOF100A and M	A50039000
EOF300A and M	A36401020
Product Description	Order No.
Activated earth element	
EOF100A	A22304043
EOF300A	A22304033
Dust filter element	
EOF100M	A22304044
EOF300M	A22304042
-	

Pumped External Oil Filters

EOF filters have their own pump, which delivers 3.5 I min $^{-1}$ / 0.89 US gal min $^{-1}$ (50 Hz) clean, decontaminated oil to the pump oil system.

The canister is available in two sizes to suit the contaminant load. The 25P and 40P elements filter dust contaminants from the oil. The 25C and 40C elements filter both dust and chemical contaminants. Both elements have a pleated paper filter to trap dust particles; the 25C and 40C elements have a bed of activated alumina for chemical adsorption.

Oil pump flow rate $3.5 \, \mathrm{I} \, \mathrm{min}^{-1} \, / \, 0.8 \, \mathrm{US} \, \mathrm{gal} \, \mathrm{min}^{-1} \, (50 \, \mathrm{Hz})$ Electrical supply $100\text{-}120 \, / \, 200\text{-}240 \, \mathrm{V}, \, 1\text{-ph}, \, 50/60 \, \mathrm{Hz}$

Current 5 A (start), 2.5 A (run)

Dimensions

 Height
 435 mm / 16.97 inch

 Width
 385 mm / 15.02 inch

 Depth
 320 mm / 12.49 inch

Weight (dry)

 Base units
 22.5 kg / 50 lb

 25 CR canister
 2.8 kg / 6 lb

 40 CR canister
 4 kg / 9 lb

Please consult Edwards or your supplier for other technical data

Ordering Information

Product Description	Order No.
CR base module, PFPE prepared	A54011999

Supplied with hoses and 2 pairs of disconnects. When you order, specify a base module canister, element and a pump connection kit separately.

EOF canisters

25CR	A54012022
40CR	A54014022
Spare elements	
40P	A22304068
25C	A22304090
40C	A22304091
Oil sampling valve	A50409000
Canister outlet pressure gauge	H01900013
Pump connection kits	
E1M/E2M40	A54000002
E1M/E2M80	A54000004
E1M/E2M175	On
	application
E1M/E2M275	On
	application

OPG Oil Pressure Gauges

Fit the OPG to the pump to allow visual indication of the oil pressure. This will provide early indication of a reduction in oil pressure so you can plan preventative maintenance. The 0-30 psig OPG gauges are buffered against pulses in the oil pressure, to give a steady reading. The OPG100HC is made of brass construction.

Ordering Information

Product Description	Order No.
OPG100HC brass oil pressure gauge	A50435000
Connection kit for fitting	On
	application

Vibration Isolators

You may need to fit vibration isolators to your pump if you mount it into a frame or system, if the mounting points are not level or if you need to minimize the transmission of vibration and noise in your application. You must fit flexible bellows or other flexible pipes to the pump inlet and outlet.

Ordering Information

Approximate Reduction in Height with Pump Fitted (mm)	Weight Set	Order No.
.5	0.6 kg/1.3 lb	A24801405
2.5	0.6 kg/1.3 lb	A24801405
3	0.9 kg/2 lb	A24801406
3.5	0.9 kg/2 lb	A24801406
	Reduction in Height with Pump Fitted (mm) .5	Reduction in Height with Pump Weight Set Fitted (mm) of Four .5 0.6 kg/1.3 lb 2.5 0.6 kg/1.3 lb 3 0.9 kg/2 lb

Details of vibration isolators for use with rotary/mechanical booster pump combinations are available on request.

OLM100 Oil Level Monitor

Fit the OLM100 in place of the oil sight glass on the E1M/E2M 40 and 80 pumps. The OLM100 continues to allow visual inspection of the oil level and condition, while also providing a switched output for remote indication. Technical data: 24 V a.c. or d.c., maximum current 0.5 A, switching power 10 W (12 VA).

Ordering Information

Product Description	Order No.
OLM100 oil level monitor	A50433000

EBV Gas Ballast Control Valves

Fit the EBV valve (EBV20 for RVs and E2M1.5 to E2M28, EBV100S for E1M40 and 80, EBV300S for E1M175 and 275, EBV300D for E2M40, 80, 175 and 275) to allow remote operation of the pump's gas ballast control. For example, the EBV can be configured to switch off the gas ballast when the pump is switched off, to provide suck-back protection. The EBV can also be configured to prevent the 175 and 275 from running backwards when the gas ballast valve is open and the pumps are stopped under vacuum.

Ordering Information

Product Description	Order No.
EBV20 (0.5 kg) 220 - 240 V s.ph 50/60 Hz	A50006930
EBV100S (0.5 kg) 220 - 240 V s.ph 50/60 Hz	A50018930
EBV300S (1.2 kg) 220 - 240 V s.ph 50/60 Hz	A50016930
EBV300D (1.0 kg) 220 - 240 V s.ph 50/60 Hz	A50017930

TCV300 Temperature Control Valve

Use the TCV300 with the E1M/E2M175 and 275 pumps. The valve facilitates rapid pump warm-up and higher operation temperatures. This improves the pump's vapor pumping performance. The TCV300 also reduces the use of cooling water and reduces operation costs.

Product Description	Order No.
TCV300 (1.2 kg/2.6 lb)	A50001000

ITF Inlet Dust Filters

The ITF inlet dust filters prevent the entry of dust particles into the pump. The impedance of a clean filter reduces the pumping speed of a $20 \, \text{m}^3\text{h-}1 / 12 \, \text{ft}^3\text{min}^{-1}$ pump by about 20% at 1 mbar / 0.75 Torr and 25% at 10 mbar / 7.5 Torr.

Depending on your application, you can normally clean the filter element with a vacuum cleaner or a clean air blast, and then re-use the element.

The benefits of the ITF filters include:

- · Thick aluminum casting, to withstand abrasion
- Tangential entry port, to promote centrifugal separation of dust particles
- Filter efficiency better than 96% (tested to BS2831, dust number 2)

Ordering Information

Product Description	Order No.
ITF100 inlet dust filter (7.0 kg/15 lb)*	A44202000
ITF300 inlet dust filter (8.3 kg/18 lb) [†]	A44203000
ITF800 inlet dust filter (20.2 kg/44 lb)**	A44204000
ITF3000 inlet dust filter ^{††}	A44212000

- * Supplied with bolts, washers, 40 mm O-ring and centering ring
- Supplied with 63 mm Co-Seal, bolts and washers
- ** Supplied with 100 mm Co-Seal, bolts and washers Supplied with 160 mm Co-Seal, bolts and washers

Spares	Order No.
ITF100 element and gasket kit	A44202800
ITF300 element and gasket kit	A44203800
ITF800 element and gasket kit	A44204800
ITF3000 element (2 required)	A22304037

ITM High Capacity Inlet Dust Filters

The ITM deep, stainless steel mesh elements are ideal for applications where fast pump-down times are required and which produce high levels of dust and grit (which would normally clog the ITF filters very quickly). You can wet the stainless steel mesh element with oil to improve dust adhesion. You can wash the mesh elements and re-use them indefinitely.

The benefits of the ITM filters include:

- Thick aluminum casting, to withstand abrasion
- Tangential entry port, to promote centrifugal separation of dust particles
- Filter efficiency better than 90% (tested to BS2831, dust number 2)
- · Glass cover, to allow a visual check of the filter element

Ordering Information

Product Description	Order No.
ITM100 high capacity dust filter (7.2 kg/16 lb)*	A44302000
ITM300 high capacity dust filter (8.7 kg/19 lb) [†]	A44303000
ITM800 inlet dust filter (20.2 kg/44 lb)**	A44304000
ITM3000 inlet dust filter ^{††}	A44312000
ITM5000 inlet dust filter	A44313000

- * Supplied with bolts, washers, 40 mm O-ring and centering ring
- † Supplied with 63 mm Co-Seal, bolts and washers ** Supplied with 100 mm Co-Seal, bolts and washers
- Supplied with 100 mm Co-Seal, bolts and washersSupplied with 160 mm Co-Seal, bolts and washers

Spares	Order No.
ITM100 filter element	A22305020
ITM300 filter element	A22305019
ITM800 filter element	A22305018
ITM3000 filter element (2 required)	A22305033

ITP800 Dust & Particulate Trap

The ITP800 dust and particulate trap is intended for use in processes where large quantities of dust and particulates will block conventional filters in a matter of hours or days. Although primarily intended for Semicon applications such as SACVD, BPSG and some PECVD processes, the ITP800 is also suitable for high-dust industrial processes.

Constructed from a series of concentric fine mesh cylinders, the ITP800 provides an unrestricted gas flow, but presents a large surface area onto which dust is collected.

The ITP800 has a complete self-contained filter element in a canister which is quick, safe and easy to remove and replace, thus reducing downtime. Contaminants are contained within the canister, reducing the risk of spillage at the pump.

Ordering Information

Product Description	Order No.
ITP800 dust & particulate trap complete	A44504000
Weight 22 kg/48 lb	
Spares	Order No.
C100 self contained filter element – spare	A44106700

ITO Inlet Catchpots

These catchpots minimize the entry of condensable vapors into the pump. Benefits of the catchpots include:

- · Capture condensable vapors
- Helps prevent froth or spray from the process from carrying over to the pump
- · Corrosion-resistant body
- · Visual indication of trapped liquid level
- · Hand-tightened drain plug, for easy drainage

Product Description	Order No.
ITO100 inlet catchpot, 5.47 liters/5.2 qt capacity (6.8 kg, 15 lb)*	A44102000
ITO300 inlet catchpot, 7.87 liters/7.5 qt capacity (8.0 kg/18 lb) [†]	A44103000
IT0800 inlet catchpot, 9.5 liters/10 qt capacity (19.5 kg/43 lb)**	A44104000

- Supplied with bolts, washers, 40 mm O-ring and centering ring
- Supplied with 63 mm Co-Seal, bolts and washers
 Supplied with 100 mm Co-Seal, bolts and washers

ITC Inlet Chemical Traps

The ITC series of chemical traps provides the following benefits:

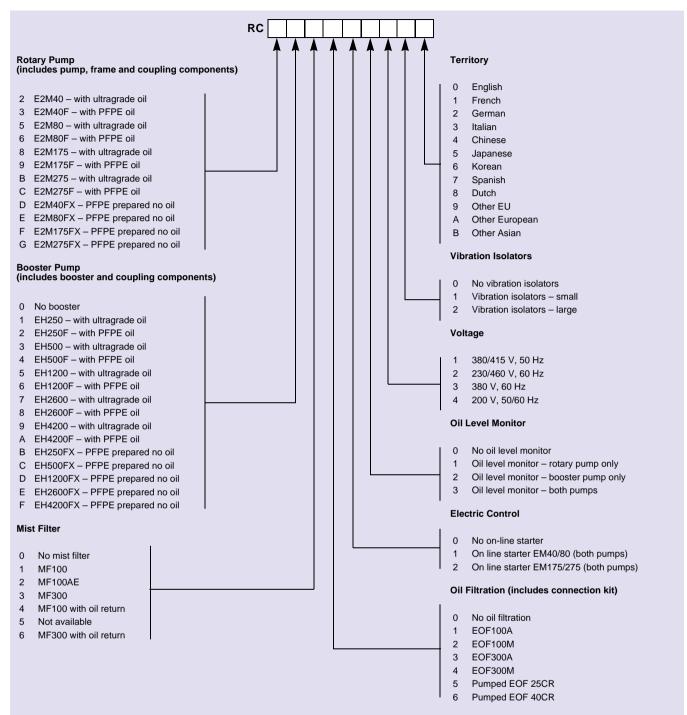
- Protection against various aggressive vapors, which may attack the pump or pump oil
- Prevent high molecular weight vapors (such as might arise in a resin treatment plant), from reaching the pump. These vapors could cause lacquering or clogging
- The standard sorbent (activated charcoal), has relatively high trapping properties (absorbs around 25% of its own weight), even when large amounts of water vapor are being pumped
- When filled with activated alumina on two-stage pumps, backstreaming of pump oil can be controlled

Ordering Information

Product Description	Order No.
ITC100 inlet chemical trap*	A44402000
Charcoal charge 0.75 kg/1.7 lb, weight 16.5 kg/1.7 lb	
ITC300 inlet chemical trap [†]	A44403000
Charcoal charge 1.1 kg/2.4 lb, weight 9 kg/20 lb	
ITC800 inlet chemical trap**	A44404000
Charcoal charge 3.3 kg/2.4 lb, weight 21 kg/20 lb	
 Supplied with bolts, washers, 40 mm O-ring and centering ring Supplied with 63 mm Co-Seal, bolts and washers Supplied with 100 mm Co-Seal, bolts and washers 	
Spares	Order No.
0.5 kg/1.1 lb activated charcoal	H12205001
3 kg/6.6 lb activated charcoal	H12205002
0.45 kg/1 lb activated alumina	H02600050
0.2 kg/0.5 lb activated alumina	H02600056

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Ordering Information – All Territories Except North America



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In today's globally competitive environment, the need for manufacturing and process equipment delivers maximum performance and reliability is greater than ever. Whether you operate at low pressure, handle large gas loads, or simply need increased capacity for your existing system, Edwards can help meet your pumping requirements.

Rugged, Reliable Operation

Every design consideration, feature and detail is thoroughly engineered to maximize uptime and extend operating life. Below are just a few features that testify to the integrity of these rugged multistage vacuum pumps.

- · Efficient, time proven design to deliver ease of maintenance
- · Low 500 rpm operation for longest pump life cycle
- Low ultimate blank-off pressures down to < 10⁻² Torr
- · Robust cast and ductile iron construction
- Hardened replaceable shaft sleeve enhances wear resistance
- Efficient design provides maximum uptime with minimal moving parts, low rotational speed and large clearance
- · New valve design virtually eliminates valve maintenance and noise
- Application specific seals maximize resistance to heat and corrosion while providing protection from gas stream oil contamination
- Standard, totally enclosed fan-cooled motors
- Space saving design saves up to 50% of valuable floor space
- Complete and self-contained delivered and ready to install
- Automatic lubrication system provides proper flow of oil to bearings and sealing surfaces, prevents back flow into system
- Controlled balancing reduces vibration to a practical minimum
- Gas ballast- standard on all models
- Total capability includes the manufacturing and service capabilities to keep your equipment in top operation – with a broad range of vacuum system accessories
- · Oxygen service models available

Solutions to Fit Your Needs

Our total vacuum capabilities include a full line of pumping systems from 150 to 7880 ft³min⁻¹ capacities. Choose from Stokes microvac rotary piston pump (J series), Stokes 1700 series high capacity mechanical booster pump combinations, and MV Series Matrix selection series mechanical booster packages, or a custom designed package to meet all your pumping needs.

J Series Overview

The Stokes J series microvac rotary piston pump sets the standard for performance and reliability as the industry's most efficient, space-saving design. The Stokes microvac rotary piston pump has been improved, upgraded, and fine-tuned to deliver even better dependability and productivity combined with minimal maintenance and process downtime.

An integral oil distribution system eliminates external piping and delivers leak-free operation in a more stylized design for the J series. A larger oil sight glass and paddle wheel design flow indicator provides easier viewing of the oil system function. A stiffer motor mounting platform cuts flexibility to minimize motor belt wear. A stylized oil reservoir cover and side cover O-rings improve sealing to eliminate oil leakage. An integral gas ballast valve built into the side cover allows quick adaptation to automatic gas ballast.

Most importantly, these improvements don't increase the industry leading space saving footprint. Inlet, outlet and mounting dimensions are exactly the same as the H series microvac rotary piston pump.

Applications

- Automotive
- · General applications
- Metallurgy
- · Vacuum coating
- · Vacuum melting
- Chemical processing
- Heat treatment
- Leak detection
- PET processing
- Pharmaceuticals
- · Transformer drying and cable fluid conditioning

By combining over a century of technical experience with a global sales and service network, Edwards adds value to your process. Our applications specialists can offer advice on a single pump or component through to a complete pumping system, custom tailored to your specifications.

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Stokes Microvac Model 212J



The Stokes Microvac rotary piston pump sets the standard for performance and reliability as the industrys most efficient, space-saving design. The Stokes Microvac rotary piston pump has been improved, upgraded, and fine-tuned to deliver even better dependability and productivity combined with minimal maintenance and process downtime.

An integral oil distribution system eliminates external piping and delivers leak-free operation in a stylized design. A stiffer motor mounting platform cuts flexibility to minimize motor belt wear. A stylized oil reservoir cover and side cover 'O' rings improve sealing to eliminate oil leakage. An integral gas ballast valve built into the side cover allows quick adaptation to automatic gas ballast.

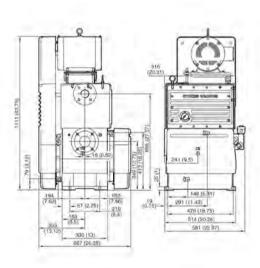
Features & Benefits

- Robust cast and ductile iron construction provides proven rugged reliable operation.
- Low 500rpm operation for longest pump life cycle.
- Efficient design provides maximum uptime with minimal moving parts, low rotational speed and large clearance.
- Low ultimate blank-off with pressures down to < 2.5 x 10⁻² Torr.
- New valve deck design virtually eliminates valve maintenance and noise.

Dimensions

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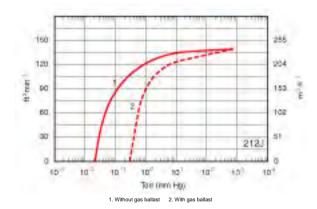
Page 314



Applications

- Automotive
- Chemical processing
- General applications
- Heat treatment
- Leak detection

Performance Curves



Dimensions (L x W x H)

Weight

Displacement (swept volume)(AVS)	255 m ³ h ⁻¹ / 150 ft ³ min ⁻¹
Ultimate vacuum (total pressure)	
without gas ballast	$<3.3x10^{-2}$ mbar $/<2.5x10^{-2}$ Torr
with gas ballast	<2.6x10 ⁻² mbar / <2x10 ⁻² Torr
50Hz Motor size (TEFC)	5.5 kW IEC (CE variant)
60Hz Motor size (TEFC)	7.5 hp TEFC
Motor speed	1800 rpm
Inlet connection	3 inch ASA/ANSI flange
Exhaust connection	2 inch ASA/ANSI flange or 2 inch NPT
Water inlet/outlet connection	½ inch NPT
Recommended cooling flow @ 85°C / 30°F	5.7 I min ⁻¹ / 1.5 gal min ⁻¹
Water vapor pumping rate	5 kg h ⁻¹ / 11 lb h ⁻¹
Oil capacity	15 liter / 4 gal
Recommended oil	V lube F
Noise level	<77 dB(A)

667 x 610 x 1105 mm 26 ¼ x 24 x 43 ½ inch

431 kg / 950 lbs

Product Description	Order No.
212J 230/460V, 3Ø, 60Hz (230/460V Coil)	900212014
212J 400V, 3-ph, 50Hz, IEC motor, 380V Coil (CE compliant)	900212014501
212J 400V, 3-ph, 50Hz, IEC motor, 415V Coil (CE compliant)	900212014502
212J 400V, 3-ph, 50Hz, IEC motor, 380V Coil with Water Miser (CE compliant)	900212014503
212J 400V, 3-ph, 50Hz, IEC motor 415V Coil with Water Miser (CE compliant)	900212014504
Accessories & Spares	Order No.
Replacement parts kit	429-638-016
Bearings	085-019-757
Valve deck assembly	607-417-001

Stokes Microvac Model 412J



The Stokes Microvac rotary piston pump sets the standard for performance and reliability as the industrys most efficient, space-saving design. The Stokes Microvac rotary piston pump has been improved, upgraded, and fine-tuned to deliver even better dependability and productivity combined with minimal maintenance and process downtime.

An integral oil distribution system eliminates external piping and delivers leak-free operation in a stylized design. A stiffer motor mounting platform cuts flexibility to minimize motor belt wear. A stylized oil reservoir cover and side cover 'O' rings improve sealing to eliminate oil leakage. An integral gas ballast valve built into the side cover allows quick adaptation to automatic gas ballast.

Features & Benefits

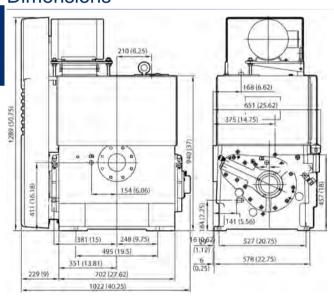
- Robust cast and ductile iron construction provides rugged reliable operation.
- Efficient design provides maximum uptime with minimal moving parts and large clearance.
- Low ultimate blank-off with pressures down to < 10⁻² Torr.
- New valve design virtually eliminates valve maintenance and noise.
- Space saving design which saves up to 50 of valuable floor space.

Applications

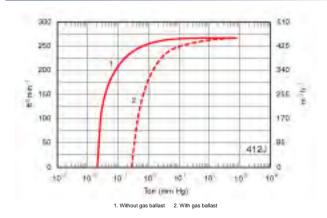
- Automotive
- · Chemical processing
- General applications
- Heat treatment
- Leak detection

Dimensions

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Performance Curves



Weight

51.1	
Displacement (swept volume)(AVS)	510 m ³ h ⁻¹ / 300 ft ³ min ⁻¹
Ultimate vacuum (total pressure)	
without gas ballast	$<3.3x10^{-2}$ mbar $/<2.5x10^{-2}$ Torr
with gas ballast	$<2.6x10^{-1}$ mbar $/<2x10^{-1}$ Torr
50Hz Motor size	11 kW IEC (CE variant)
60Hz Motor size	10 hp TEFC
Motor speed	1800 rpm
Inlet connection	4 inch ASA/ANSI flange
Exhaust connection	3 inch ASA/ANSI flange or 3 inch NPT
Water inlet/outlet connection	½ inch NPT
Recommended cooling flow @ 85°C / 30°F	7.6 l min ⁻¹ / 1.5 gal min ⁻¹
Water vapor pumping rate	$10.45 \text{ kg h}^{-1} / 23 \text{ lb h}^{-1}$
Oil capacity	46 liter / 12 gal
Recommended oil	V lube F
Noise level	<83 dB(A)
Dimensions (L x W x H)	1022 x 661 x 1314 mm
	40 1/4 x 25 5/8 x 51 3/4 inch

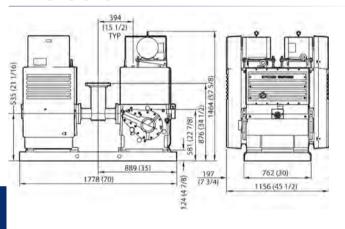
794 kg / 1750 lbs

Product Description	Order No.
412J 230/460V, 3Ø, 60Hz (230/460V Coil)	900412014
412J 400V, 3-ph, 50Hz, IEC motor 380V Coil (CE compliant)	900412014501
412J 400V, 3-ph, 50Hz, IEC motor 415V Coil (CE compliant)	900412014502
412J 400V, 3-ph, 50Hz, IEC motor, 380V Coil with Water Miser (CE compliant)	900412014503
412J 400V, 3-ph, 50Hz, IEC motor 415V Coil with Water Miser (CE compliant)	900412014504
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001

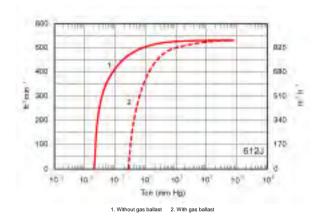
The Stokes Microvac rotary piston pump sets the standard for performance and reliability as the industrys most efficient, space-saving design. The Stokes Microvac rotary piston pump has been improved, upgraded, and fine-tuned to deliver even better dependability and productivity combined with minimal maintenance and process downtime.

An integral oil distribution system eliminates external piping and delivers leak-free operation in a stylized design. A stiffer motor mounting platform cuts flexibility to minimize motor belt wear. A stylized oil reservoir cover and side cover 'O' rings improve sealing to eliminate oil leakage. An integral gas ballast valve built into the side cover allows quick adaptation to automatic gas ballast.

Dimensions



Performance Curves



Technical Data

Displacement (swept volume)(AVS)	1020 m ³ h ⁻¹ / 600 ft ³ min ⁻¹
Ultimate vacuum (total pressure)	
without gas ballast	<3.3 x 10 ⁻² mbar / <2.5 x 10 ⁻² Torr
with gas ballast	$<2.6 \times 10^{-1} \text{ mbar} / <2 \times 10^{-1} \text{ Torm}$
50Hz Motor size	11 kW IEC (CE variant) (x2)
60Hz Motor size	10 hp TEFC (x2)
Motor speed	1800 rpm
Inlet connection	6 inch ASA/ANSI flange

Exhaust connection 2 x 3 inch ASA/ANSI flange or 3 inch NPT

Cooling medium Water

Weight

Water inlet/outlet connection 2 x ½ inch NPT

Recommended cooling flow @ $85^{\circ}F/30^{\circ}C$ 7.6 l min $^{-1}/1.5$ gal min $^{-1}(x2)$

Water vapor pumping rate 20.9 kg h⁻¹ / 46 lb h⁻¹
Oil capacity 92 liter / 24 gal
Recommended oil V lube F
Noise level <85 dB(A)

Dimensions (L x W x H) 1137 x 1778 x 1438 mm

44 ¾ x 70 x 56 5/8 inch 1724 kg / 3800 lbs

Ordering Information

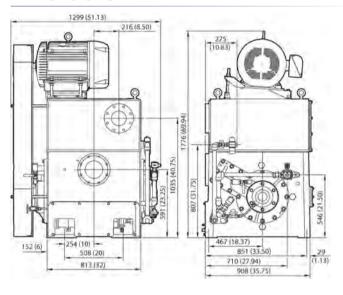
Product Description	Order No.
612J 230/460V, 3-ph, 60Hz (230/460V Coil)	900612014
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001

The Stokes Microvac rotary piston pump sets the standard for performance and reliability as the industrys most efficient, space-saving design. The Stokes Microvac rotary piston pump has been improved, upgraded, and fine-tuned to deliver even better dependability and productivity combined with minimal maintenance and process downtime.

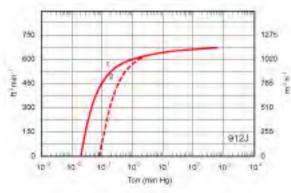
An integral oil distribution system eliminates external piping and delivers leak-free operation in a stylized design. A stiffer motor mounting platform cuts flexibility to minimize motor belt wear. A stylized oil reservoir cover and side cover 'O' rings improve sealing to eliminate oil leakage. An integral gas ballast valve built into the side cover allows quick adaptation to automatic gas ballast.



Dimensions



Performance Curves



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Technical Data

Displacement (swept volume)(AVS)	1240 m ³ h ⁻¹ / 728 ft ³ min ⁻¹
Ultimate vacuum (total pressure)	
without gas ballast	$<3.3 \times 10^{-2} \text{ mbar} / <2.5 \times 10^{-2}$ Torr
with gas ballast	$<2.6 \times 10^{-1} \text{ mbar} / <2 \times 10^{-1} \text{ Torr}$
50Hz Motor size	22 kW TEFC
60Hz Motor size	30 hp TEFC
Motor speed	1800 rpm
Inlet connection	6 inch ASA/ANSI flange
Exhaust connection	5 inch NPT
Cooling medium	Water

Recommended oil V lube F
Noise level <85 dB(A)

Dimensions (L x W x H) 1283 x 1013 x 1689 mm 50 ½ x 39 7/8 x 66 ½ inch

Weight 2495 kg / 5500 lbs

Ordering Information

Product Description	Order No.
912J 230/460V, 3-ph, 60Hz (230/460V Coil)	900912010
Accessories & Spares	Order No.
Valve deck springs	247172001
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002

Shop online at www.edwardsvacuum.com

Stokes Microvac Accessories

Water Miser

Features & Benefits

- · Saves cooling water, improves efficiency
- · Remote bulb temperature sensor in oil reservoir of vacuum pump
- · Throttles valve on cooling water to control oil temperature
- · Fits most water cooled vacuum pumps

Ordering Information

Product Description	For Pump	Order No.
Water Miser	149H-412J	900412124

Gas Ballast Silencer

Features & Benefits

- · Cuts noise level
- · Simple thread-in unit reduces noise level
- · Filters gas ballast intake air

Ordering Information

Product Description	For Pump	Order No.
151 Series Gas Ballast Silencer/Filter		
# Required		
1	146H, 148H, 149H/S	900151001
1	212J	900151002
2 or 4	412J / 612J	900151002
2	912J	900151003

Min-Max Cooler

The Edwards Model 170-116 mini-max compact cooler provides closed circuit cooling specially designed for mobile pumping systems. It includes pump, radiator, fan, motor (115/60/1), on-off switch, connection kit for the microvac pumps, and has a cooling capacity of 14000 BTU/hr. The mini-max cooler is ideal when cooling water is not convenient or clean enough to ensure peak performance.

Technical Data

For use with Model 149, 212 & 412 Rotary Piston Pumps

Motor 1/4 hp (Pump and Fan)
Motor Voltage 115 V, 1-ph, 60 Hz
230 V, 1-ph, 60 Hz
Cooling Capacity 14000 BTU/hour

Hose Length 5 feet
Reservoir Tank Capacity 3 gallons

Overall Dimensions 12 1/4" W x 23 1/4" I X 13 1/4" H

Weight 50 lbs

Ordering Information

Product Description	Order No.
Minimax Cooling System	900170116

Includes: Pump, Radiator, Fan, Motors, On-Off Switch, Piping, Wiring and Hoses.

Oil Mist Separators

The 291 series oil mist separators are high performance air/oil coalescing separators that will virtually eliminate all liquids and solids from a gas stream. These units produce exhaust liquid levels as low as 0.05 PPMW and solids removal in excess of 99.79% efficiency for particulate as small as 0.3 micron.

Features & Benefits

- · Clean pump exhaust, saves oil
- Two-stage design removes ail smog and traps particles as small as 0.3 microns
- Standard and heavy models available

Heavy Duty Oil Mist Filter

Heavy-duty oil mist separators are designed to handle the most severe oil exhaust situations from rotary oil sealed mechanical pumps. For true measure of efficiency, it is important to go beyond the weight to consider the actual number of particles collected. The heavy-duty oil mist separators efficiency by weight approaches 100% and total particle collection 97.8%. Edwards guarantees to collect and remove the stated percentage of particles by size, not by weight alone. The HD mist separator will effectively prevent fume emissions unlike existing separators that do not remove the sub micron particles.

Product Description	For Pump	CFM	Replacement Elements	Order No.
Oil Mist Separa	•			Order No.
291-30S	146H		085021473	900291021
291-50S	148H		085021474	900291022
291-100S	149H		085021475	900291023
291-150S	212H		085052035	900291024
291-150J	212J only		085052263	900291J24
291-300S	412H, 612H		085052036	900291025
291-300J	412J only		085052264	900291J25
291-750S	912J		085021478	900291026
291-750MB	612MB		085021478	900291027
Oil Mist Separa	tor with Polypro	pylene	Element	
291-30SO	146H		085039836	900291031
291-50SO	148H		085039837	900291032
291-100SO	149H		085039838	900291033
291-150SO	212H		085039839	900291034
291-300SO	412H, 612H		085039840	900291035
291-750SO	912J, 612MB		085039841	900291036
Heavy Duty Oil Mist Separators				
291-150HD	212H and smaller	150	085038239	900291048
291-300HD	412H	300	085038125	900291049
291-600HD	612H	600	085038226	900291050
291-1000HD	Combinations	1000	085044934	900291054
291-1500HD	Combinations	1500	085045429	900291055

Oil Reservoir Heater

Edwards model 212 and 412 oil reservoir heaters are recommended for pre-heating oil in the reservoir prior to pump start up at temperatures below 55 °F. Below 1 Torr., it will help maintain the oil at a temperature high enough to prevent condensation of water vapor in the oil when running with full gas ballast. The 212 and 412 oil reservoir heaters consist of an immersion heater to be inserted into the oil reservoir and an over-temperature switch with sensing bulb to control power to the heater. The heater arrangement can be factory or field installed.

Vacuum Break Solenoid

Features & Benefits

- 2-way 240 V 3/8 inch FNPT
- 2-way 110 V 3/8 inch FNPT

Ordering Information

Product description	For pump	Order No.
Vacuum Break Solenoid	All 240 V	085046623
	All 110 V	085046998

Gask-O-Seal

Features & Benefits

- · For tight joint seals
- · Combination anodized aluminum retainer with Buna-N seals
- Range to 0.0001 microns

Ordering Information

Gask-O-Seal Pipe Size (inch) 1.5 90031800 2 90031800 4 90031800 6 90031801 8 90031801 10 90031801 12 90031801
1.5 90031800 2 90031800 3 90031800 4 90031800 6 90031801 8 90031801 10 90031801
2 90031800 3 90031800 4 90031800 6 90031801 8 90031801 10 90031801
3 90031800 4 90031800 6 90031801 8 90031801 10 90031801
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8 90031801 10 90031801
10 90031801
12 00031801
12 90031801
14 90031801
16 90031801
18 90031801
20 90031801
24 90031801

Flex Hose

The model 820 high vacuum hose from Edwards is an all-plastic hose with aluminum flanges tough enough for easy handling streamline use. This rugged, reliable hose is suitable for use in a temperature range of -50 °F to 150 °F, tested to 10⁻² Torr absolute pressure

Ordering Information

Product Description	Flange Gasket	Order No.
Series 820 High Vacuum	Hose	
Size		
2" x 20' long	08510028	900820220
3" x 20' long	023001141	900820206
4" x 20' long	023001129	900820208

Flex Connectors

Model 315 flexible connectors feature rugged type 321 stainless steel bellows to sharply ease potential alignment and thermal expansion problems, while significantly reducing vibration transmissions from other equipment. They are designed to provide years of trouble-free service.

Features & Benefits

- · Free-formed bellows minimize stress concentration
- · Solve alignment problems
- Convoluted bellows of AISI 321 stainless steel
- · ASA standard carbon steel flanges
- Sizes from 1.5 inch to 24 inch

Ordering Information

Product Description	Order No.
Type Standard: Flexible connector, vacuum service, o	convoluted,
stainless steel bellows, carbon steel pipe flange, 150	# ASA - both
ends – 63 micro finish. Mass spec tested.	

Pipe Size (inch)

1-1/2	900315005
2	900315006
3	900315008
4	900315009
6	900315011
8	900315012
10	900315013
12	900315014

Type CE: Flexible connector, vacuum service, convoluted, stainless steel bellows, carbon steel weld band – one end – to fit over ASA pipe for lap weld, carbon steel pipe flange, 150# ASA – one end – 63 micro finish, Mass spec tested.

Pipe Size (inch)

1-1/2	900315099
3	900315102
4	900315103
6	900315105

Type PP: Flexible connector, vacuum service, convoluted, stainless steel bellows, carbon steel pipe ends – both ends – for butt welding, Mass spec tested.

Pipe Size (inch)

1-1/2	900315069
2	900315070
3	900315072
4	900315073
6	900315075
8	900315076
10	900315077
12	900315078

Type EE: Flexible connector, vacuum service, convoluted, stainless steel bellows, carbon steel weld band – both ends – to fit over ASA pipe for lap weld, Mass spec tested.

Pipe Size (inch)

2	900315090
4	900315093
6	900315095
8	900315096
10	900315097
12	900315098

Type CP: Flexible connector, vacuum service, convoluted, stainless steel bellows, carbon steel pipe end – one end – for butt welding, carbon steel pipe flange, 150# ASA – one end – 63 micro finish, Mass spec tested.

Pipe Size (inch)

2	900315080
3	900315082
4	900315083
6	900315085
8	900315086
12	900315088

High Volume Inlet Filters

Features & Benefits

- Traps particulates ahead of pump
- · Recommended ahead of all vacuum pumps
- · Provide protection to pump internals
- Extends the change interval up to 10 times
- · Variety of filter elements available
- 146H pump has a 2 inch flange 333-30A has a 1 inch flange. 333-100A (2 inch flange) can be used as an option
- 1754 and 1755 have 8 inch flange. Customer must supply an adaptor to mate with 10 inch flange on filter
- Polyester replacement element max temp 200 °F, Glastex replacement element 450 °F
- 1700 Series requires 2 replacement elements

Ordering Information

Product			
Description	For Pump	CFM	Order No.
Intake Pipeline Fi	Iters		
333-30A*	146H	30	900333031
333-50A	148H	50	900333032
333-100A	149H	100	900333033
333-165A	212J	165	900333034
333-330A	412J	400	900333035
333-750A	612J, 912J	850	900333036
333-1125A	1721, 1722, 1738	2000	900333037
333-2250A [†]	1739, 1733, 1754	2800	900333038
Spares			Order No.
Replacement Gla	stex Elements [‡]		
333-30A*			085032573
333-50A			085032576
333-100A			085032579
333-165A			085032582
333-330A			085032585
333-750A			085032079
333-1125A			085032588**
333-2250A [†]			085032591**
Replacement Pol	yester Elements [‡]		
333-30A*			085039010
333-50A			085039011
333-100A			085039012
333-165A			085039013
333-330A			085039014
333-750A			085039077
333-1125A			085039015**
333-2250A [†]			085039016**
* 1/6H Pump bas a 2	" Flange Filter 333-304 has	a 1" Flance I le	o Filtor 222-1004 w/2"

- 146H Pump has a 2" Flange, Filter 333-30A has a 1" Flange. Use Filter 333-100A w/2"
- † 1754 and 1755 have 8" Flange. Customer must supply an adapter to mate w/10" Flange
- Replacement Element is Polyester w/Maximum Temp of 200°F, Glastex has a Maximum Temp. of 450°F.
- ** Two Elements Are Required.

Small Volume Inlet Filter

Features & Benefits

- For small volumes and fast pump down cycles
- Effective protection from harmful solid particles of 0.01 inch or larger
- Less expensive than conventional filters.

Ordering Information

Product Description	Flange Size	For Pump	Replacement Elements	Order No.
Small Volume	Inlet Filter	'S		
332-3	3"	212J	085036701	900332003
332-4	4"	412J	085036702	900332004
332-6	6"	612J-912J	085036703	900332006
332-8	8"	1721-1722	085036704	900332008

Oil Purifiers

Oil purifiers continuously supply clean oil to the vacuum pump to assure peak uptime while prolonging the life of both the oil and the pump. Oil purifiers from Edwards are designed for use with rotary oil sealed pumps used in dirty applications or for corrosive and hazardous gases. These oil purifiers are commonly used in heat creating, annealing, sintering, brazing, nitriding, and metal melting. The Edwards models are available to handle hydrocarbon and inert oils for rotary oil sealed pumps up to 750 ft³min⁻¹ and can filter out solids to 3 microns.

Features & Benefits

- · Keep pump fluids cleaner
- Self-contained and portable
- Suitable for mechanical vacuum pumps up to 730 ft³min⁻¹
- · Models available for hydrocarbon and inert oils

Product Description	For Pump	GPM	Elements Required	Order No.
Vacuum Pump Oil Purifiers				
339-015 (115 V, 1-ph, 60 Hz)	146, 148, 149	1.5	1	900339015
339-015 CE (230 V, 1-ph, 50 Hz)	146, 148, 149	1.2	1	900339015501
339-015 CE (200/400 V, 3-ph, 50 Hz)	146, 148, 149	1.2	1	900339015502
339-030 (115 V, 1-ph, 60 Hz)	212, 412	3	1	900339030
339-030 CE (230 V, 1-ph, 50 Hz)	212, 412	2.3	1	900339030501
339-030 CE (200/400 V, 3-ph, 50 Hz)	212, 412	2.3	1	900339030502
339-150	All	1.5	2	900339150
339-215	All	1.5	2	900339215
339-070	912	7	2	900339070
Special Service (all pumps)				
339-15 (115 V, 1-ph, 60 Hz)*	146, 148, 149	1.5	1	900339151
339-152 (115 V, 1-ph, 60 Hz) [†]	146-412	1.5	2	900339152
339-251(115 V, 1-ph, 60 Hz)*	146-412	1.5	2	900339251
339-252 (115 V, 1-ph, 60 Hz) [†]	146-412	1.5	4	900339252
Spares				Order No.
Model 339 Replacement Oil Purifier Elements			ments	
Standard 339 Filter Fullers Earth 10 microns			nicrons	085033395
Standard 339 Filter Pleated Paper 3 microns			nicrons	085039432
Standard 339 Filter Activated Alumna				085039890
Special Service 339 Fullers Earth 10 microns			microns	N/A (use 3
				Microns Option)
Special Service 339		aper 3 i	microns	

- Single element canister
- † Double element canister

8

MB Series / MV Series Vertically Oriented Booster Combinations



Overview

Edwards multi-stage pumping systems, backed by over a century of in-depth applications knowledge and technical experience.

These compact, efficient pumping systems feature a Stokes microvac pump and rugged, proven Stokes 6" Series boosters or the Edwards EH series with patented hydrokinetic drive. MB series configurations are comprised of the Stokes 412J piston pumps coupled with a model 607 mechanical booster. The configuration has the ability to start at atmospheric pressure without the need for a pressure switch, packages are offered as a cost-effective alternative for low to medium range capacity requirement.

The MV Series Mechanical Booster Pump Packages comprises of either the Stokes 212J or 412J rotary piston pump. Each can be directly coupled with a range of mechanical booster pumps. The range includes Edwards EH series offering the patented Hydrokinetic Drive or the full range of Stokes 6" series. All are vertical gas flow orientation for a compact space saving design. The MV Series offers a broad selection of configurations which enables the flexibility to mix and match the complete range of Stokes Microvac accessories along with various electrical control options. This enables the user to customize the pumping package to meet their application requirements.

1700 Series High Capacity Mechanical Booster Pump Combinations



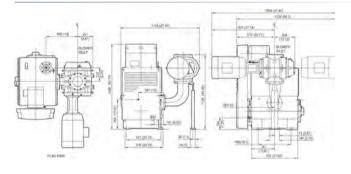
Overview

Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes 1700 series mechanical booster combinations includes a Stokes microvac backing pump and a belt driven, Stoke 6" series mechanical booster pump horizontal flow. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster combinations include a pressure switch, motor starters, fuses and overload.

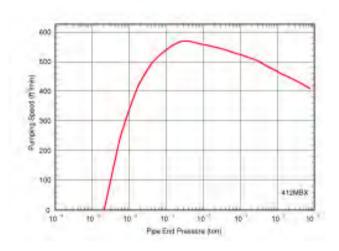
The Stokes 1700 series combinations deliver the high capacity needed to achieve faster pump-downs. Most importantly, these systems achieve the task more cost effectively than larger single stage pumps. Depending on the specific application, they can improve blank-off by a factor of ten over large, single stage pumps. Pumping capacities range from 1300 to 7880 ft³min⁻¹.

Stokes MB Multi-stage pumping systems are available in two options, consisting of a Microvac piston pump and a Stokes 607 mechanical booster pump. The compact direct mounted packages provide high performance pumping from atmosphere. The MB systems are ideal for high cycling arduous applications.

Dimensions



Performance Curves



Technical Data

Blower displacement (swept volume) (AVS)

Pump displacement (swept volume) (AVS)

Blower motor size

Microvac motor size

Blower motor

Microvac motor

Inlet connection

Exhaust connection

Microvac water inlet/outlet

Recommended cooling flow @

30 °C/85 °F

Booster oil capacity Microvac oil capacity

Booster recommended oil

Microvac recommended oil

Dimensions (L x W x H)

Height to inlet

Weight

 $1040 \text{ m}^3 \text{ h}^{-1} / 612 \text{ ft}^3 \text{ min}^{-1}$

 $510 \text{ m}^3 \text{ h}^{-1} / 300 \text{ ft}^3 \text{ min}^{-1}$

15 kW / 20 hp

7.5 kW / 10 hp

1800 rpm

1800 rpm

6 inch ASA/ANSI flange

3 inch ASA/ANSI flange or 3

inch NPT

1/2 inch NPT

7.6 liter min -1 / 1 US gal min -1

4.2 liter / 22 US gal

46 liter / 12 US gal

V lube H

V lube F

973 x 1022 x 1365 mm

47 x 55.69 x 51.75 inch

868 mm / 34.19 inch

1202 kg / 2650 lbs

Ordering Information

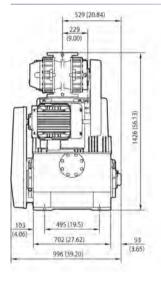
Product Description	Order No.
412MBX Multi-stage Pumping System 230/460V, 3Ø, 60 Hz with 230/460V Coil	900412072
Accessories & Spares	Order No.
Replacement parts kit for 412H pump	429-638-012
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

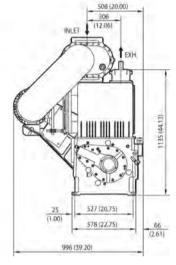
Stokes MB Multi-stage pumping systems are available in two options, consisting of a Microvac piston pump and a Stokes 607 mechanical booster pump. The compact direct mounted packages provide high performance pumping from atmosphere. The MB systems are ideal for high cycling arduous applications.

The 612MB Multi-stage pumping systems incorporate an integral bypass valve which offers increased speed at atmospheric pressure.



Dimensions





 $1040 \text{ m}^3 \text{ h}^{-1} / 612 \text{ ft}^3 \text{ min}^{-1}$

 $510 \text{ m}^3 \text{ h}^{-1} / 300 \text{ ft}^3 \text{ min}^{-1}$

6 inch ASA/ANSI flange

7.6 liter min -1 / 2 US gal min -1

15 kW / 20 hp

1800 rpm

4 inch NPT

½ inch NPT

V lube H V lube G

4.7 liter / 7 US gal

46 liter / 12 US gal

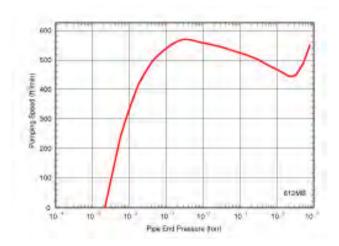
1181 x 1022 x 1434 mm 47 x 55.69 x 51.75 inch

1434 mm / 56.44 inch

1452 kg / 3200 lbs

No

Performance Curves



8

Page 325

Technical Data

Blower displacement (swept volume) (AVS)

Pump displacement (swept volume) (AVS)

Pressure switch required

Blower motor size ***

Motor

Inlet connection

Exhaust connection

Microvac water inlet/outlet connection

Recommended cooling flow @

30 °C/85 °F

30 'C/03 'I

Weight

Booster oil capacity
Microvac oil capacity

Booster recommended oil Microvac recommended oil

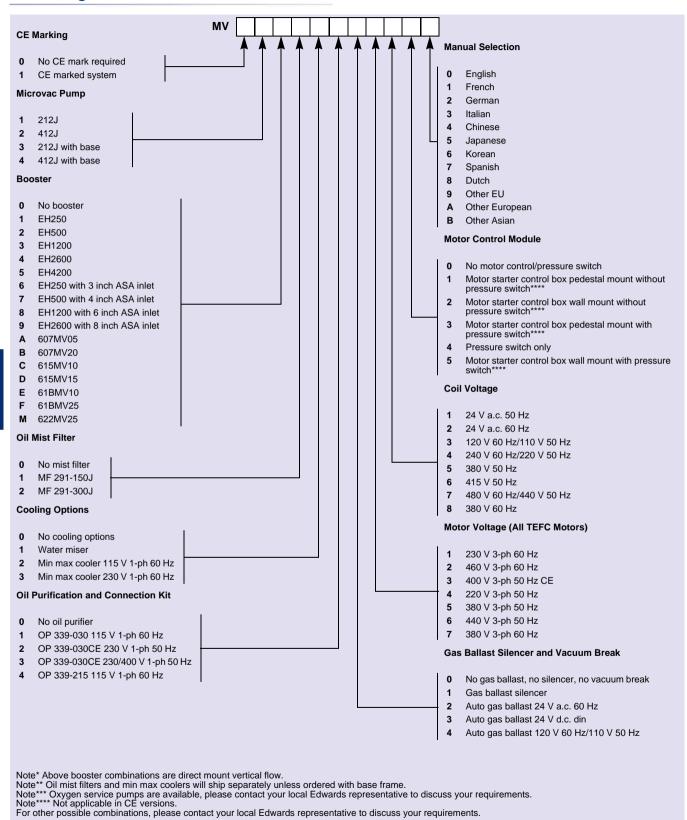
Dimensions (L x W x H)

Height to inlet

*** 612 MB incorporates double shafted single motor

Product Description	Order No.
612MBX Multi-stage Pumping System 230/460V, 3Ø, 60 Hz with 230/460V Coil	900612J30
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

MV Series Oil Sealed Piston Pumps and Mechanical Booster Combinations

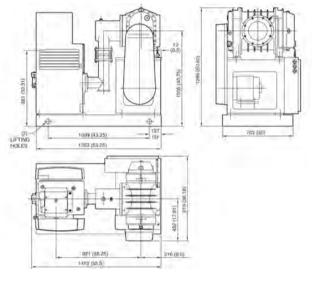


Stokes 1721 Mechanical Booster Pump Combination

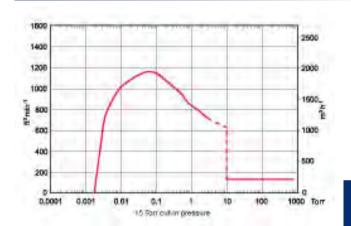
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves



Technical Data

Booster displacement $2210 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 1300 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ 1800 rpm Booster speed Booster orientation Pump displacement 255 m³ h⁻¹ / 150 ft³ min⁻¹ Pressure switch required 20 mbar / 15 Torr Normal cut-in pressure Continuous operation pressure 4 mbar / 3 Torr 5.6 kW / 7.5 hp Booster drive Pump drive (TEFC) 5.6 kW / 7.5 hp Inlet connections 8 inch ASA/ANSI flange 2 inch ASA/ANSI flange, 2 inch Discharge connections Water inlet/outlet connection 1/2 inch NPT Recommended cooling flow @ 5.7 I min⁻¹ / 1.5 gal min⁻¹

Booster oil capacity (V lube H)

Microvac oil capacity (V lube F)

Inlet height

1.9 liter / 0.51 US gal

15 liter / 4 US gal

1035 mm / 40.75 inch

1419 x 919 x 1260 mm

55.87 x 36.18 x 49.61 inch

Weight

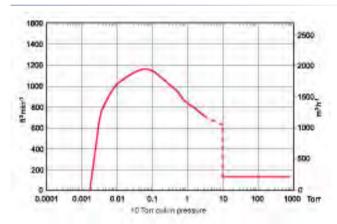
1225 kg / 2700 lbs

Product Description	Order No.
1721 230/460V, 3-ph, 60Hz (230/460V Coil)	900170061
Accessories & Spares	Order No.
Replacement parts kit	429-638-016
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Dimensions

1099 (43.25) 921 (65.25)

Performance Curves



Technical Data

Inlet height

Weight

Footprint (L x W x H)

Booster displacement	2720 m h -1 / 1600 ft min -1
Booster speed	2200 rpm
Booster orientation	Horizontal
Pump displacement	255 m ³ h ⁻¹ / 150 ft min ⁻¹
Pressure switch required	Yes
Normal cut-in pressure	13 mbar / 10 Torr
Continuous operation pressure limit	2.6 mbar / 2 Torr
Booster drive	7.5 kW / 10 hp
Pump drive (TEFC)	6.5 kW / 7.5 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	2 inch ASA/ANSI flange, 2 NPT
Water inlet/outlet connection	½ inch NPT

2 inch 1/2 inch NPT Recommended cooling flow @ 5.7 I min⁻¹ / 1.5 gal min⁻¹ 1.9 liter / 0.51 US gal Booster oil capacity (V lube H) 15 liter / 4 US gal Microvac oil capacity (V lube F) 1035 mm / 40.75 inch 1419 x 919 x 1260 mm 55.87 x 36.18 x 49.61 inch 1270 kg / 2800 lbs

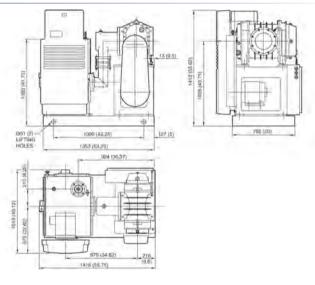
Product Description	Order No.
1721S 230/460V, 3-ph, 60Hz (230/460V Coil)	900170074
Accessories & Spares	Order No.
Replacement parts kit	429-638-016
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 1722 Mechanical Booster Pump Combination

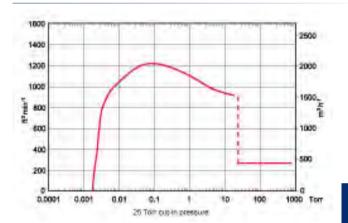
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves



Technical Data

2210 m³h⁻¹ / 1300 ft³min⁻¹ Booster displacement 1800 rpm Booster speed Booster orientation Horizontal 510 m³ h⁻¹ / 300 ft³ min⁻¹ Pump displacement Pressure switch required 33 mbar / 25 Torr Normal cut-in pressure Continuous operation pressure 20 mbar / 15 Torr Booster drive 5.6 kW / 7.5 hp Pump drive (TEFC) 7.5 kW / 10 hp Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections Water inlet/outlet connection ½ inch NPT

Recommended cooling flow @ 30°C/85 °F 7.6 I min -1 / 2 gal min -1

Booster oil capacity (V lube H) 1.9 liter / 0.51 US gal

Microvac oil capacity (V lube F) 46 liter / 12 US gal

Inlet height 1035 mm / 40.75 inch

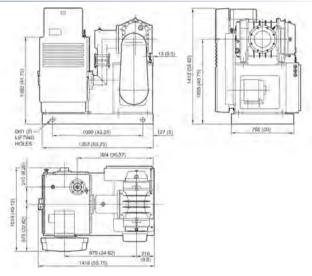
Footprint (L x W x H) 1407 x 1048 x 1438 mm

55.40 x 41.26 x 56.61 inch

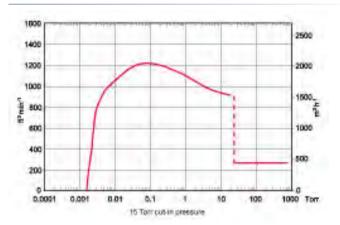
Weight 1588 kg / 3500 lbs

Order No.
900170062
Order No.
429-638-015
085-019-757
607-417-001
607552001
607552002

Dimensions



Performance Curves



Technical Data

Microvac oil capacity (V lube F)

Inlet height

Weight

Footprint (L x W x H)

Booster displacement 2720m³h⁻¹ / 1600 ft³min⁻¹ 2200 rpm Booster speed Booster orientation Horizontal 510 m³ h⁻¹ / 300 ft³ min⁻¹ Pump displacement Pressure switch required 20 mbar / 15 Torr Normal cut-in pressure Continuous operation pressure 10.7 mbar / 8 Torr Booster drive 7.5 kW / 10 hp Pump drive (TEFC) 7.5 kW / 10 hp Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections Water inlet/outlet connection ½ inch NPT Recommended cooling flow @ 7.6 I min⁻¹ / 2 gal min⁻¹ 30°C/85°F 1.9 liter / 0.51 US gal Booster oil capacity (V lube H)

46 liter / 12 US gal

1633 kg / 3600 lbs

1035 mm / 40.75 inch

1407 x 1048 x 1438 mm 55.40 x 41.26 x 56.61 inch

Ordering Information

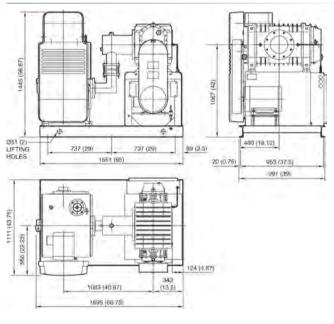
Product Description	Order No.
1722S 230/460V, 3-ph, 60Hz (230/460V Coil)	900170075
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 1733 Mechanical Booster Pump Combination

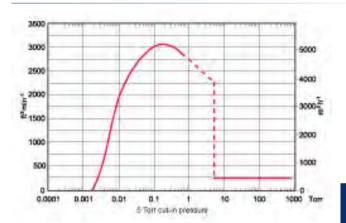
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves



Technical Data

Continuous operation pressure limit 0.8 mbar / 0.6 Torr limit 8 booster drive 18.5 kW / 25 hp Pump drive 7.5 kW / 10 hp

Inlet connections 8 inch ASA/ANSI flange
Discharge connections 3 inch ASA/ANSI flange, 3 inch

Water inlet connection ½ inch NPT (2)

Water outlet connection ½ inch NPT

Recommended cooling flow @ 30°C/85 °F

Booster oil capacity (V lube H) Microvac oil capacity (V lube F) Weight 7.61 I min⁻¹ / 2 gal min⁻¹ 1.9 liter / 0.51 US gal

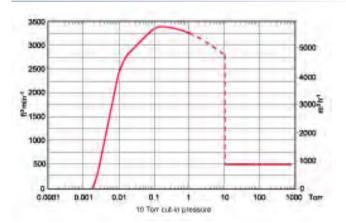
46 liter / 12 US gal 1710 kg / 3770 lbs

Product Description	Order No.
1733 230/460V, 3-ph, 60Hz (230/460V Coil)	900170S33
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Dimensions

76 - 850 (23 82) 318 (80 (31.50) 485 (19.12) 992 (35.57) 1776 (70) 107 (7.37) 1111 (45.75) 457 (18) 1898 (73.75) 2134 (84)

Performance Curves



Technical Data

30°C/85°F

Weight

Booster oil capacity (V lube H) Microvac oil capacity (V lube F)

6538 m³h⁻¹ / 3840 ft³min⁻¹ Booster displacement Booster speed 3600 rpm Horizontal Booster orientation 1020 m³ h⁻¹ / 600 ft³ min⁻¹ Pump displacement Pressure switch required 13.3 mbar / 10 Torr Normal cut-in pressure Continuous operation pressure 1.3 mbar / 1 Torr Booster drive 22.5 kW / 30 hp Pump drive 7.5 kW (x2) / 10 hp (x2) 8 inch ASA/ANSI flange Inlet connections 3 inch ASA/ANSI flange, 3 inch Discharge connections NPT (x2) Water inlet/outlet connection 1/2 inch NPT (x2) Recommended cooling flow @ 7.61 I min⁻¹ (x2) / 2 gal min⁻¹

1.9 liter / 0.51 US gal

92 liter / 24 US gal

2767 kg / 6100 lbs

Ordering Information

Product Description	Order No.
1733HC 230/460V, 3-ph, 60Hz (230/460V Coil)	900170S34
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

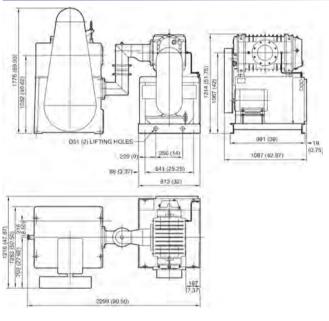
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Stokes 1733HD Mechanical Booster Pump Combination

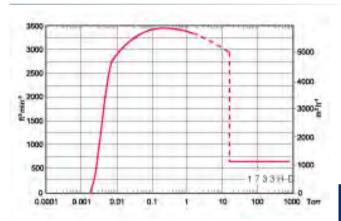
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves

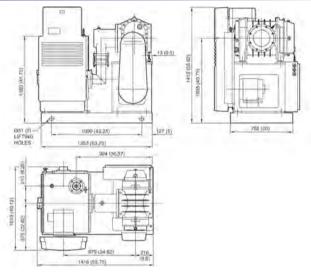


Technical Data

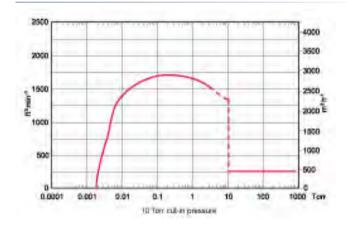
6538 m³h⁻¹ / 3840 ft³min⁻¹ Booster displacement 3600 rpm Booster speed Booster orientation Horizontal 1240 m³ h⁻¹ / 730 ft min⁻¹ Pump displacement Pressure switch required Normal cut-in pressure 20 mbar / 15 Torr Continuous operation pressure 2 mbar / 1.5 Torr limit Booster drive 22.5 kW / 30 hp Pump drive 22.5 kW / 30 hp Inlet connections 8 inch ASA/ANSI flange 3 inch NPT Discharge connections 1 inch NPT Water inlet/outlet connection Recommended cooling flow @ 18.9 I min⁻¹ / 5 gal min⁻¹ 30°C/85 °F Booster oil capacity (V lube H) 1.9 liter / 0.51 US gal Microvac oil capacity (V lube F) 76 liter / 20 US gal Weight 3538 kg / 7800 lbs

Product Description	Order No.
1733HD 230/460V, 3-ph, 60Hz (230/460V Coil)	900170S35
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002
Valve deck springs	274172001

Dimensions



Performance Curves



Technical Data

Booster oil capacity (V lube H)

Inlet height

Weight

Footprint (L x W x H)

Microvac oil capacity (V lube F)

. commount and	
Booster displacement	3398 m h -1 / 2000 ft min
Booster speed	2750 rpm
Booster orientation	Horizontal
Pump displacement	$510 \text{ m}^3 \text{ h}^{-1} / 300 \text{ ft}^3 \text{ min}^{-1}$
Pressure switch required	Yes
Normal cut-in pressure	13 mbar / 10 Torr
Continuous operation pressure limit	4 mbar / 3 Torr
Booster drive	7.5 kW / 10 hp
Pump drive (TEFC)	7.5 kW / 10 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	3 inch ASA/ANSI flange, 3 inch NPT
Water inlet/outlet connection	½ inch NPT
Recommended cooling flow @ 30°C/85 °F	7.6 l min ⁻¹ / 2 gal min ⁻¹

1.9 liter / 0.51 US gal

1035 mm / 40.75 inch

1407 x 1048 x 1438 mm 55.40 x 41.26 x 56.61 inch

46 liter / 12 US gal

1633 kg / 3600 lbs

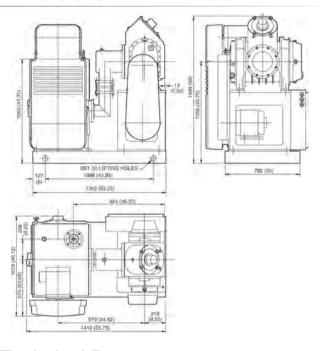
Product Description	Order No.
1738 230/460V, 3-ph, 60Hz (230/460V Coil)	900170038
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 1738BP Mechanical Booster Pump Combination

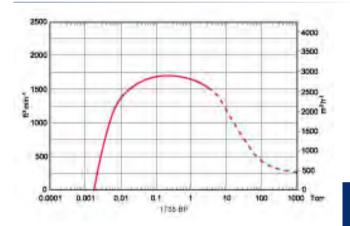
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves



Technical Data

Recommended cooling flow @

Booster oil capacity (V lube H)

Microvac oil capacity (V lube F)

30°C/85 °F

Weight

 $3398 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 2000 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ Booster displacement 2750 rpm Booster speed Booster orientation Horizontal 510 m³h⁻¹ / 300 ft³min⁻¹ Pump displacement Pressure switch required Continuous operation pressure 4 mbar / 3 Torr 11 kW / 15 hp Booster drive 7.5 kW / 10 hp Pump drive (TEFC) Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections ½ inch NPT Water inlet/outlet connection

7.6 I min⁻¹ / 2 gal min⁻¹

1.9 liter / 0.51 US gal

46 liter / 12 US gal

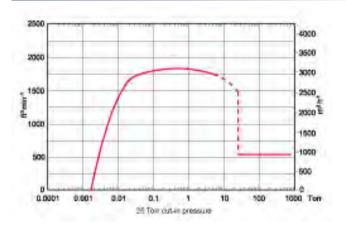
1690 kg / 3725 lbs

Order No.
90017038B
Order No.
429-638-015
085-019-757
607-417-001
607552001
607552002

Dimensions

76 610 (84) (1.10) 456 (17.25) 456 (17.25) 100 (4) 762 (30) 1100 (40) 216 (0.50)

Performance Curves



Technical Data

Booster displacement $3398 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 2000 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ 2750 rpm Booster speed Horizontal Booster orientation 1020 m³ h⁻¹ / 600 ft³ min⁻¹ Pump displacement Pressure switch required Yes Normal cut-in pressure 33 mbar / 25 Torr Continuous operation pressure 6.7 mbar / 5 Torr Booster drive 7.5 kW / 10 hp Pump drive (TEFC) 7.5 kW (x2) / 10 hp (x2)

Booster drive 7.5 kW / 10 hp

Pump drive (TEFC) 7.5 kW (x2) / 10 hp (x2)

Inlet connections 8 inch ASA/ANSI flange

Discharge connections 3 inch ASA/ANSI flange, 3 inch NPT (x2)

Water inlet/outelt connection
Recommended cooling flow @
30°C/85°F
Booster oil capacity (V lube H)

Booster oil capacity (V lube H) Microvac oil capacity (V lube F) Weight 7.6 I min⁻¹ (x2) / 2 gal min⁻¹ (x2) 1.9 liter / 0.51 US gal 92 liter / 24 US gal 2404 kg / 5300 lbs

Ordering Information

Product Description	Order No.
1738HC 230/460V, 3-ph, 60Hz (230/460V Coil)	90017C038
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

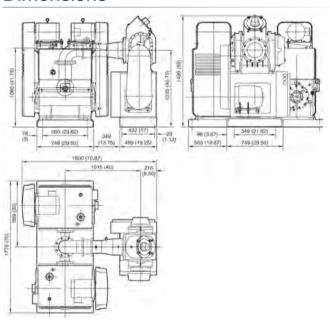
8

Stokes 1738 HCBP Mechanical Booster Pump Combination

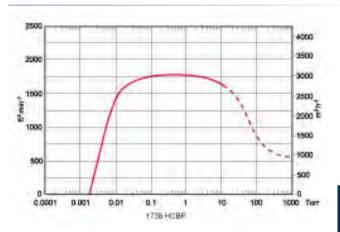
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Dimensions



Performance Curves



Technical Data

Booster oil capacity (V lube H)

Microvac oil capacity (V lube F)

Weight

Booster displacement 3398 m³h⁻¹ / 2000 ft³min⁻¹ 2750 rpm Booster speed Horizontal Booster orientation $1020 \text{ m}^3 \text{ h}^{-1} / 600 \text{ ft}^3 \text{ min}^{-1}$ Pump displacement Pressure switch required Continuous operation pressure 6.7 mbar / 5 Torr limit Booster drive 11.2 kW / 15 hp Pump drive (TEFC) 7.5 kW (x2) / 10 hp (x2) Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections NPT (x2) Water inlet/outlet connection ½ inch NPT (x2) Recommended cooling flow @ 7.6 l min⁻¹ (x2) / 2 gal min⁻¹ (x2) 30°C/85°F

1.9 liter / 0.51 US gal

92 liter / 24 US gal

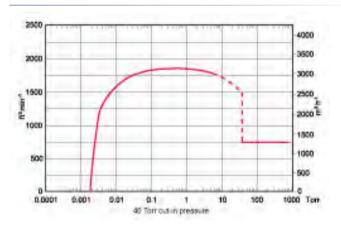
2449 kg / 5400 lbs

Product Description	Order No.
1738HCBP 230/460V, 3-ph, 60Hz (230/460V Coil)	90017C38B
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Tropiacoment o booster maintenance kit	007002002

Dimensions

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Performance Curves



Technical Data

recrimical Data	
Booster displacement	3398 m h -1 / 2000 ft min -1
Booster speed	2750 rpm
Booster orientation	Horizontal
Pump displacement	1240 m ³ h ⁻¹ / 730 ft min ⁻¹
Pressure switch required	Yes
Normal cut-in pressure	53 mbar / 40 Torr
Continuous operation pressure limit	16 mbar / 12 Torr
Booster drive	11 kW / 15 hp
Pump drive (TEFC)	22.5 kW / 30 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	5 inch NPT
Water inlet/outlet connection	1 inch NPT
Recommended cooling flow @ 30°C/85°F	18.9 I min ⁻¹ / 5 gal min ⁻¹
Booster oil capacity (V lube H)	1.9 liter / 0.51 US gal
Microvac oil capacity (V lube F)	76 liter / 20 US gal
Weight	3187 kg / 7025 lbs

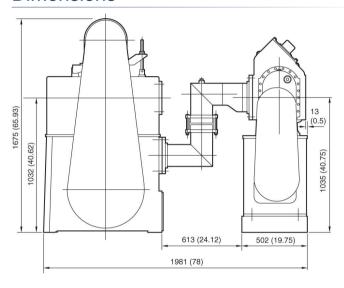
Product Description	Order No.
1738HD 230/460V, 3-ph, 60Hz (230/460V Coil)	90017D038
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002
Valve deck springs	274172001

Stokes 1738HDBP Mechanical Booster Pump Combination

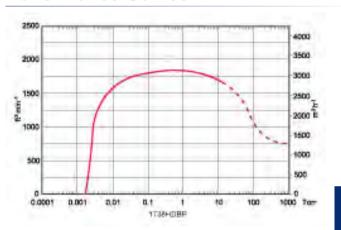
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves

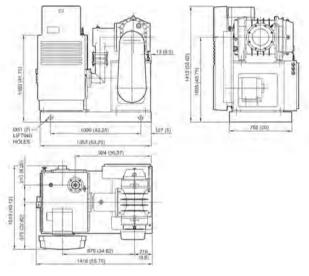


Technical Data

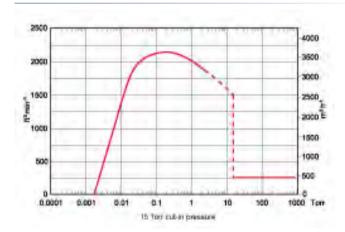
Booster displacement	3398 m ³ h ⁻¹ / 2000 ft ³ min ⁻¹
Booster speed	2750 rpm
Booster orientation	Horizontal
Pump displacement	1240 m ³ h ⁻¹ / 730 ft ³ min ⁻¹
Pressure switch required	No
Continuous operation pressure limit	16 mbar / 12 Torr
Booster drive	11 kW / 15 hp
Pump drive (TEFC)	22 kW / 30 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	5 inch NPT
Water inlet/outlet connection	1 inch NPT
Recommended cooling flow @ 30°C/85 °F	18.9 I min ⁻¹ / 5 gal min ⁻¹
Booster oil capacity (V lube H)	1.9 liter / 0.51 US gal
Microvac oil capacity (V lube F)	76 liter / 20 US gal
Weight	3221 kg / 7100 lbs

Product Description	Order No.
1738HDBP 230/460V, 3-ph, 60Hz (230/460V Coil)	90017D38B
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002
Valve deck springs	274172001

Dimensions



Performance Curves



Technical Data

30°C/85 °F

Inlet height

Weight

Footprint (L x W x H)

Booster oil capacity (V lube H) Microvac oil capacity (V lube F)

Booster displacement	4420 m ³ h ⁻¹ / 2600 ft min ⁻¹
Booster	3600 rpm
Booster orientation	Horizontal
Pump displacement	510 m ³ h ⁻¹ / 300 ft ³ min ⁻¹
Pressure switch required	Yes
Normal cut-in pressure	13 mbar / 10 Torr
Continuous operation pressure limit	2.7 mbar / 2 Torr
Booster drive	22.4 kW / 30 hp
Pump drive (TEFC)	7.5 kW / 10 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	3 inch ASA/ANSI flange, 3 inch NPT
Water inlet/outlet connection	½ inch NPT
Recommended cooling flow @	7.6 L min -1 / 2 mal min -1

7.6 I min⁻¹ / 2 gal min⁻¹

1.9 liter / 0.51 US gal

46 liter / 12 US gal

1067 mm / 42 inch

1803 kg / 3975 lbs

1905 x 1270 x 1318 mm 75 x 50 x 51.89 inch

Ordering Information

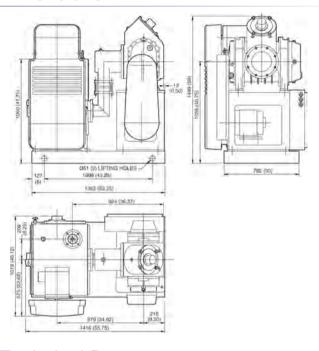
Product Description	Order No.
1739 230/460V, 3-ph, 60Hz (230/460V Coil)	900170039
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 1739BP Mechanical Booster Pump Combination

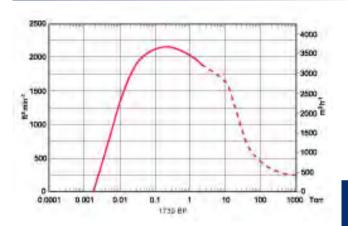
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Dimensions



Performance Curves



Technical Data

Weight

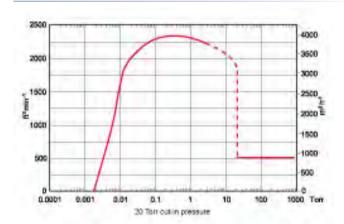
 $4420 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 2600 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ Booster displacement 3600 rpm Booster speed Booster orientation Horizontal 510 m³ h⁻¹ / 300 ft³ min⁻¹ Pump displacement Pressure switch required Continuous operation pressure 2.7 mbar / 2 Torr 22 kW / 30 hp Booster drive 7.5 kW / 10 hp Pump drive (TEFC) Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections ½ inch NPT Water inlet/outlet connection Recommended cooling flow @ 7.6 I min⁻¹ / 2 gal min⁻¹ 30°C/85 °F Booster oil capacity (V lube H) 1.9 liter / 0.51 US gal Microvac oil capacity (V lube F) 46 liter / 12 US gal

1837 kg / 4050 lbs

Product Description	Order No.
1739BP High Capacity Mechanical Booster Pump Combination 230/460V, 3Ø, 60 Hz with 230/460V Coil	90017039B
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Dimensions

Performance Curves



Technical Data

Water inlet/outlet connection
Recommended cooling flow @

Booster oil capacity (V lube H)

Microvac oil capacity (V lube F)

30°C/85°F

Weight

Booster displacement 4420 m³h⁻¹ / 2600 ft³min⁻¹ 3600 rpm Booster speed Horizontal Booster orientation 1020 m³ h⁻¹ / 600 ft³ min⁻¹ Pump displacement Pressure switch required Normal cut-in pressure 33 mbar / 25 Torr Continuous operation pressure 3.4 mbar / 2.5 Torr Booster drive 18.6 kW / 25 hp Pump drive (TEFC) 7.5 kW (x2) / 10 hp (x2) Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections

1/2 inch NPT (x2)

1.9 liter / 0.51 US gal

92 liter / 24 US gal

2733 kg / 6025 lbs

7.6 l min⁻¹ (x2) / 2 gal min⁻¹ (x2)

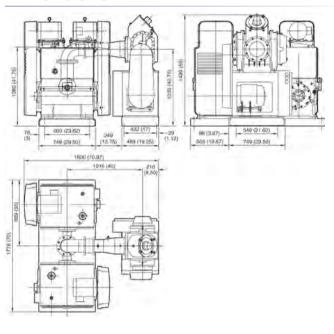
Product Description	Order No.
1739HC 230/460V, 3-ph, 60Hz (230/460V Coil)	90017C039
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 1739HCBP Mechanical Booster Pump Combination

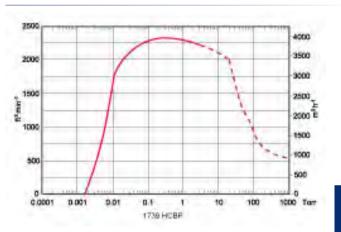
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Dimensions



Performance Curves



Technical Data

Microvac oil capacity (V lube F)

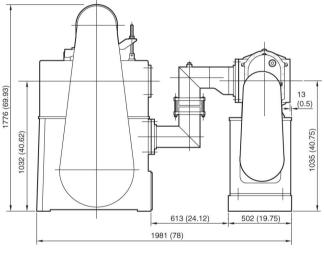
Weight

Booster displacement 4420 m³h⁻¹ / 2600 ft³min⁻¹ 3600 rpm Booster speed Horizontal Booster orientation $1020 \text{ m}^3 \text{ h}^{-1} / 600 \text{ ft}^3 \text{ min}^{-1}$ Pump displacement Pressure switch required Continuous operation pressure 4 mbar / 3 Torr limit Booster drive 18.6 kW / 25 hp Pump drive (TEFC) 7.5 kW (x2) / 10 hp (x2) Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections NPT (x2) Water inlet/outlet connection ½ inch NPT (x2) Recommended cooling flow @ 7.6 l min⁻¹ (x2) / 2 gal min⁻¹ (x2) 30°C/85°F Booster oil capacity (V lube H) 1.9 liter / 0.51 US gal

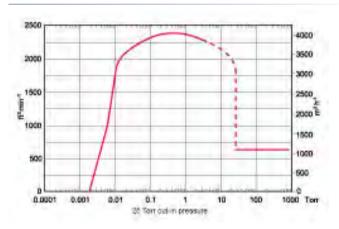
> 92 liter / 24 US gal 2767 kg / 6100 lbs

Product Description	Order No.
1739HCBP 230/460V, 3-ph, 60Hz (230/460V Coil)	90017C39B
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Dimensions



Performance Curves



Technical Data

Toominoar Bata	
Booster displacement	4420 m h -1 / 2600 ft min -1
Booster speed	3600 rpm
Booster orientation	Horizontal
Pump displacement	1240 m ³ h ⁻¹ / 730 ft min ⁻¹
Pressure switch required	Yes
Normal cut-in pressure	47 mbar / 35 Torr
Continuous operation pressure limit	4 mbar / 3 Torr
Booster drive	18.5 kW / 25 hp
Pump drive (TEFC)	22.5 kW / 30 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	5 inch NPT
Water inlet/outlet connection	1 inch NPT
Recommended cooling flow @ 30°C/85 °F	18.9 I min ⁻¹ / 5 gal min ⁻¹
Booster oil capacity (V lube H)	1.9 liter / 0.51 US gal
Microvac oil capacity (V lube F)	76 liter / 20 US gal
Weight	3504 kg / 7725 lbs

Ordering Information

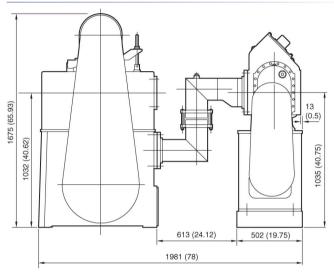
Product Description	Order No.
1739HD 230/460V, 3-ph, 60Hz (230/460V Coil)	90017D039
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002
Valve deck springs	274172001

Stokes 1739HDBP Mechanical Booster Pump Combination

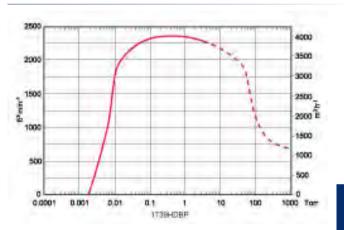
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Dimensions



Performance Curves



Technical Data

Booster displacement	4420 m ³ h ⁻¹ / 2600 ft min ⁻¹
Booster speed	3600 rpm
Booster orientation	Horizontal
Pump displacement	1240 m ³ h ⁻¹ / 730 ft min ⁻¹
Pressure switch required	No
Continuous operation pressure limit	4 mbar / 3 Torr
Booster drive	18.5 kW / 25 hp
Pump drive	22.5 kW / 30 hp
Inlet connections	8 inch ASA/ANSI flange
Discharge connections	5 inch NPT
Water inlet/outlet connection	1 inch NPT
Recommended cooling flow @ 30°C/85°F	18.9 I min ⁻¹ / 5 gal min ⁻¹
Booster oil capacity (V lube H)	1.9 liter / 0.51 US gal
Microvac oil capacity (V lube F)	76 liter / 20 US gal
Weight	3538 kg / 7800 lbs

Product Description	Order No.
1739HDBP 230/460V, 3-ph, 60Hz (230/460V Coil)	90017D39B
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Replacement oil seal	085018191
Replacement roller bearing	085033795
Roller bearing with adaptive sleeve	085033794
Valve deck stainless steel clappers	272963002
Valve deck springs	274172001

Stokes 1754 Mechanical Booster Pump Combination

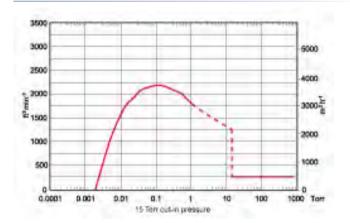


Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.

Dimensions

GS1 (2) GS1 (2) GS1 (2) GS1 (2) GS1 (2) GS1 (35) G

Performance Curves



Technical Data

5100 m³h⁻¹ / 3000 ft³min⁻¹ Booster displacement 2750 rpm Booster speed Horizontal Booster orientation 510 m³h⁻¹ / 300 ft³min⁻¹ Pump displacement Pressure switch required Normal cut-in pressure 20 mbar / 15 Torr Continuous operation pressure 1.3 mbar / 1 Torr Booster drive 15 kW / 20 hp Pump drive 7.5 kW / 10 hp Inlet connections 8 inch ASA/ANSI flange 3 inch ASA/ANSI flange, 3 inch Discharge connections

Water inlet connection ½ inch NPT (2)
Water outlet connection ½ inch NPT
Recommended cooling flow @

30°C/85°F
Booster oil capacity (V lube H)
Microvac oil capacity (V lube F)
Weight

7.61 I min⁻¹ / 2 gal min⁻¹
1.9 liter / 0.51 US gal
46 liter / 12 US gal
1678 kg / 3700 lbs

Ordering Information

Product Description	Order No.
1754 230/460V, 3-ph, 60Hz (230/460V Coil)	900170054
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

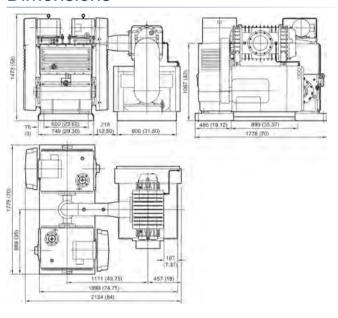
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Stokes 1754HC Mechanical Booster Pump Combination

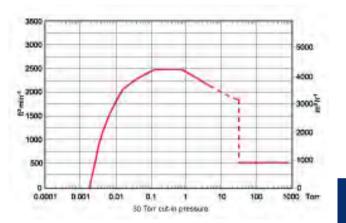
Whether you need to increase the capacity of your existing system or achieve peak performance for a new installation; Edwards makes taking advantage of the latest technology easy. These field-proven pumping systems are the workhorse of countless industrial and large chamber applications. Each Stokes1700 series mechanical booster pump combination includes a Stokes Microvac backing pump and a belt driven, horizontal flow, high vacuum Stokes 6" series mechanical booster pump. In harsh applications where chemical or particulate contamination is present, process isolation boosters are available as an option. Controls for Stokes 1700 series mechanical booster pump combination include a pressure switch, motor starters, overloads, remote booster selection switch and lights for pump running and fault indication.



Dimensions



Performance Curves



Technical Data

30°C/85°F

Weight

Booster oil capacity (V lube H)

Microvac oil capacity (V lube F)

5100 m³h⁻¹ / 3000 ft³min⁻¹ Booster displacement Booster speed 2750 rpm Horizontal Booster orientation 1020 m³ h⁻¹ / 600 ft³ min⁻¹ Pump displacement Pressure switch required 40 mbar / 30 Torr Normal cut-in pressure Continuous operation pressure 4 mbar / 3 Torr Booster drive 18.5 kW / 25 hp Pump drive 7.5 kW (x2) / 10 hp (x2) 8 inch ASA/ANSI flange Inlet connections 3 inch ASA/ANSI flange, 3 inch Discharge connections NPT (x2) Water inlet/outlet connection 1/2 inch NPT (x2) Recommended cooling flow @ 7.61 I min⁻¹ (x2) / 2 gal min⁻¹

1.9 liter / 0.51 US gal

92 liter / 24 US gal

2722 kg / 6000 lbs

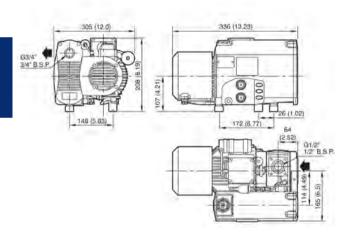
Product Description	Order No.
1754HC 230/460V, 3-ph, 60Hz (230/460V Coil)	900170055
Accessories & Spares	Order No.
Replacement parts kit	429-638-015
Bearings	085-019-757
Valve deck assembly	607-417-001
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.

Features & Benefits

- · Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- Low noise and vibration
- Air cooled

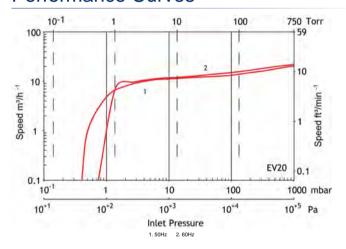
Dimensions



Applications

- Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz

Pumping speed 60 Hz

Ultimate comparative partial pressure without gas ballast

18 m³h⁻¹ / 11 ft³min⁻¹

21 m³h⁻¹ / 13 ft³min⁻¹

11 x 10 mbar

pressure without gas ballast <1 x 10 mbar

Water vapor capacity 0.4 kg h⁻¹ @ 10 mbar /

Oil Type UG20

Product Description	Order No.
EV20 175-260/300-450V, 50Hz, 190-290/330-	105040040
500V, 60Hz	A35010940

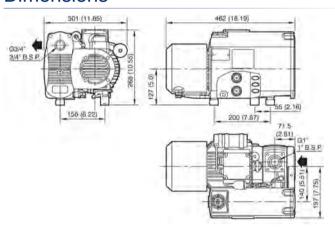
With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.



Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- Low noise and vibration
- Air cooled

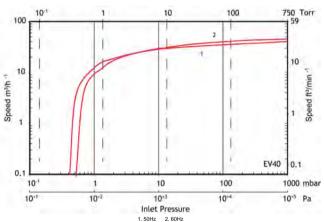
Dimensions



Applications

- · Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



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Technical Data

Pumping speed 50 Hz $41 \text{ m}^3 \text{ h}^{-1} / 25 \text{ ft}^3 \text{ min}^{-1}$ $48 \text{ m}^3 \text{ h}^{-1} / 29 \text{ ft}^3 \text{ min}^{-1}$ Pumping speed 60 Hz Ultimate comparative partial <1 x 10⁻¹ mbar pressure without gas ballast 0.3 kg h⁻¹ @ 10 mbar / Water vapor capacity 0.7 lb h⁻¹ @ 10 mbar 190-255 / 330-440 V Electricity supply 50 Hz 190-290 / 330-500 V Electricity supply 60 Hz Motor Power 50 Hz 1.5 kW / 2.0 hp

 Motor Power 60 Hz
 1.8 kW / 2.5 hp

 Noise 50 Hz
 69 dB(A)

 Noise 60 Hz
 71 dB(A)

 Weight
 38 kg / 84 lbs

 Oil capacity
 1 liter / 0.26 US gal

Oil Type UG20

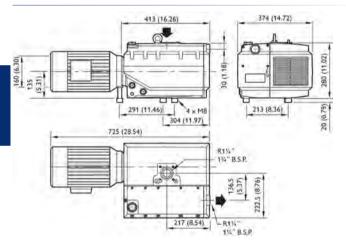
Product Description	Order No.
EV40 190-255/330-440V, 50Hz, 190-290/330-	A35015940
500V, 60Hz	

With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.

Features & Benefits

- · Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- · Low noise and vibration
- Air cooled

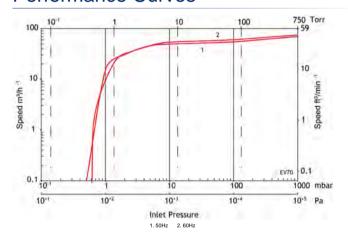
Dimensions



Applications

- Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

 $58 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 35 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ Pumping speed 50 Hz $73 \,\mathrm{m}^3 \,\mathrm{h}^{-1} / 44 \,\mathrm{ft}^3 \,\mathrm{min}^{-1}$ Pumping speed 60 Hz Ultimate comparative partial <1 x 10⁻¹ mbar pressure without gas ballast Water vapor capacity 0.57 kg h⁻¹ @ 10 mbar / 1.3 lb h⁻¹ @ 10 mbar 190-255 / 330-440 V Electricity supply 50 Hz Electricity supply 60 Hz 190-290 / 330-500 V 2.4 kW / 3.25hp Motor Power 50 Hz Motor Power 60 Hz 3 kW / 4.0hp Noise 50 Hz 67 dB(A)

68.5 dB(A)

62 kg / 136 lbs

2 liter / 0.53 US gal

Oil Type UG20

Noise 60 Hz

Oil capacity

Weight

Product Description	Order No.
EV70 190-255/330-440V, 50Hz, 190-290/330-	A35020940
500V, 60Hz	

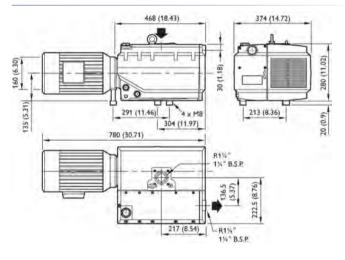
With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using either Edwards EH or MB mechanical boosters.



Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- · Low noise and vibration
- Air cooled

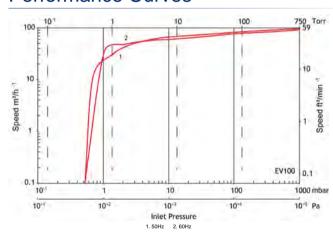
Dimensions



Applications

- Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



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Technical Data

Electricity supply 60 Hz 190-290 / 330-500 V Motor Power 50 Hz 2.4 kW / 3.25 hp Motor Power 50 Hz 3 kW / 4.0 hp Noise 50 Hz 67.5 dB(A) Noise 60 Hz 69 dB(A) Weight 65 kg / 143 lbs Oil capacity 2 liter / 0.53 US gal

Oil Type UG20

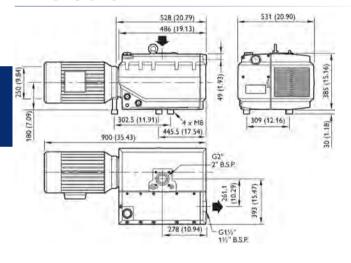
Product Description	Order No.
EV100 190-255/330-440V, 50Hz, 190-	A25025040
290/330-500V, 60Hz	A35025940

With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.

Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- Gas ballast valve fitted as standard
- Low noise and vibration
- Air cooled

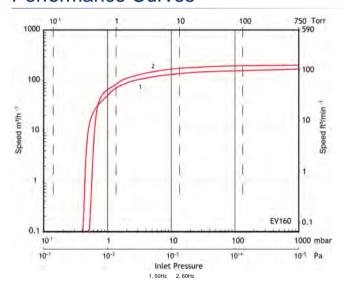
Dimensions



Applications

- · Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz Pumping speed 60 Hz

Ultimate comparative partial pressure without gas ballast

Water vapor capacity

Electricity supply 50 Hz Electricity supply 60 Hz Motor Power 50 Hz Motor Power 60 Hz Noise 50 Hz

Noise 60 Hz Weight Oil capacity

Oil Type

 $160 \text{ m}^3 \text{ h}^{-1} / 96 \text{ ft}^3 \text{ min}^{-1}$ 192 m³ h⁻¹ / 116 ft min⁻¹

<1 x 10⁻¹ mbar

1.2 kg h⁻¹ @ 10 mbar / 2.6 lb h⁻¹ @ 10 mbar 190-255 / 330-440 V 190-290 / 330-500 V 4 kW / 5.5 hp

71 dB(A) 74 dB(A) 129 kg / 284 lbs 7 liter / 1.84 US gal

4.8 kW / 6.5 hp

UG20

Product Description	Order No.
EV160 190-255/330-440V, 50Hz, 190-	A35030940
290/330-500V, 60Hz	

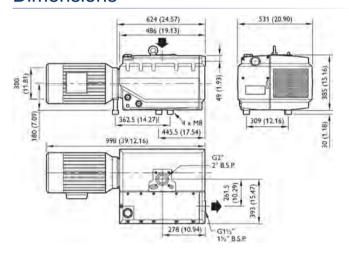
With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.



Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- · Low noise and vibration
- Air cooled

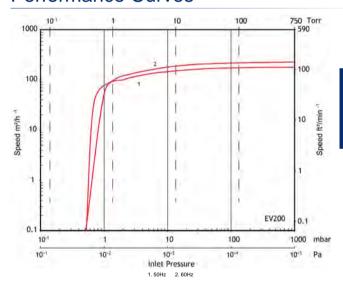
Dimensions



Applications

- · Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz
Pumping speed 60 Hz

Ultimate comparative partial pressure without gas ballast

Water vapor capacity

Electricity supply 50 Hz Electricity supply 60 Hz

Motor Power 50 Hz Motor Power 60 Hz Noise 50 Hz Noise 60 Hz Weight Oil capacity 184 m h - 1 / 111 ft min - 1 221 m h - 1 / 133 ft min - 1

<1 x 10⁻¹ mbar

1.33 kg h⁻¹ @ 10 mbar / 2.9 lb h⁻¹ @ 10 mbar

340-430V / 588-745V or 200V 340-500V / 590-865V or 200V

5.5 kW / 7.5 hp 6.4 kW / 8.5 hp 73 dB(A) 76 dB(A) 163 kg / 359 lbs 7 liter / 1.84 US gal

Oil Type UG20

Ordering Information

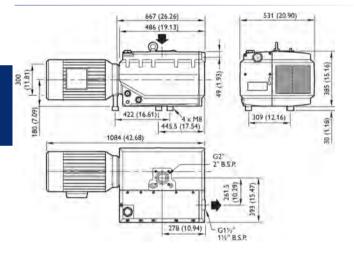
Product Description	Order No.
EV200 200V, 50/60Hz	A35035934
EV200 340-430/588-745V, 50Hz, 340-	A35035940
500/590-865V, 60Hz	A33033940

With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.

Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- Gas ballast valve fitted as standard
- Low noise and vibration
- Air cooled

Dimensions



240 m³ h⁻¹ / 145 ft min⁻¹

 $274 \text{ m}^3 \text{ h}^{-1} / 165 \text{ ft}^3 \text{ min}^{-1}$

1.4 kg h⁻¹ @ 10 mbar /

340-430V / 588-745V or 200V 340-500V / 590-865V or 200V

3.1 lb h⁻¹ @ 10 mbar

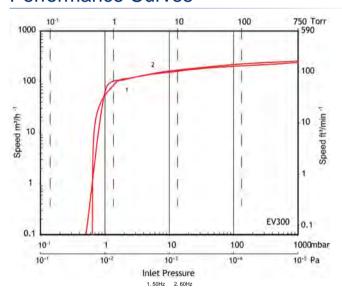
7.8 kW / 10.5 hp

<1 x 10⁻¹ mbar

Applications

- Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz Pumping speed 60 Hz

Ultimate comparative partial pressure without gas ballast

Water vapor capacity

Electricity supply 50 Hz Electricity supply 60 Hz Motor Power 50 Hz

Motor Power 60 Hz Noise 50 Hz Noise 60 Hz Weight

9.3 kW / 12.5 hp 73 dB(A) 76 dB(A) 178 kg / 392 lbs Oil capacity 7 liter / 1.84 US gal UG20 Oil Type

Product Description	Order No.
EV300 200V, 50/60Hz	A35040934
EV300 340-430/588-745V, 50Hz, 340- 500/590-865V, 60Hz	A35040940

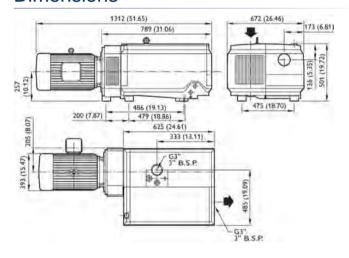
With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.



Features & Benefits

- Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- · Low noise and vibration
- Air cooled

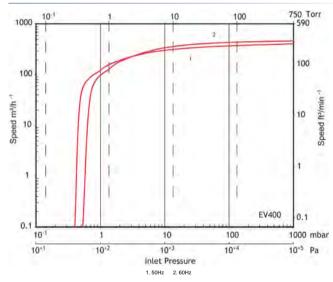
Dimensions



Applications

- · Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz

Pumping speed 60 Hz

400 m³h

480 m³h

Ultimate comparative partial

pressure without gas ballast

Water vapor capacity

Electricity supply 50 Hz Electricity supply 60 Hz

Motor Power 50 Hz
Motor Power 60 Hz
Noise 50 Hz
Noise 60 Hz
Weight
Oil capacity

Oil Type

400 m³ h⁻¹ / 241 ft³ min⁻¹ 480 m³ h⁻¹ / 289 ft³ min⁻¹

<1 x 10⁻¹ mbar 6.0 kg h⁻¹ @ 10 mbar /

13.2 lb h⁻¹ @ 10 mbar 340-430V / 588-745V or 200V 340-500V / 590-865V or 200V

11 kW / 15 hp 12.5 kW / 17 hp 78 dB(A) 81 dB(A) 400 kg / 880 lbs 15 liter / 3.96 US gal

UG20

Ordering Information

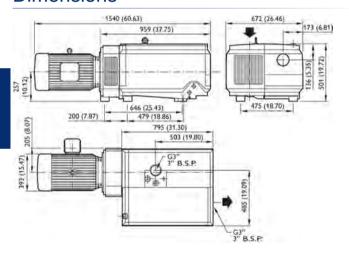
Product Description	Order No.
EV400 200V, 50/60Hz	A35045934
EV400 340-430/588-745V, 50Hz, 340-	A35045940
500/590-865V, 60Hz	

With reliability and ease of service in mind, the EV range of pumps are designed for the industrial and scientific markets. Edwards Applications Specialists have unrivalled knowledge and can advise on pump selection, configuration and operation to suit any customers' requirements. The EV range can be supplied individually or as part of preengineered combinations using Edwards EH mechanical boosters.

Features & Benefits

- · Continuous operation from atmosphere to ultimate vacuum
- High pumping speed at low pressure
- · Gas ballast valve fitted as standard
- · Low noise and vibration
- Air cooled

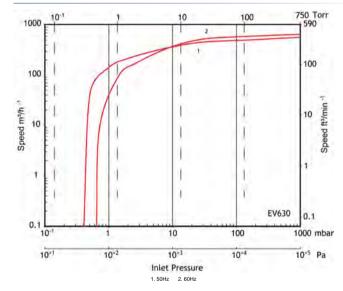
Dimensions



Applications

- Furnaces and metallurgy industries
- Food processing and packaging
- Lifting
- Vacuum coating
- Vacuum transporting

Performance Curves



Technical Data

Pumping speed 50 Hz $630 \text{ m}^3 \text{ h}^{-1} / 380 \text{ ft}^3 \text{ min}^{-1}$ Pumping speed 60 Hz $750 \text{ m}^3 \text{ h}^{-1} / 452 \text{ ft}^3 \text{ min}^{-1}$ Ultimate comparative partial pressure without gas ballast $10.4 \text{ kg h}^{-1} @ 4 \text{ mbar}$ Water vapor capacity $10.4 \text{ kg h}^{-1} @ 4 \text{ mbar}$ Electricity supply 50 Hz $400 \text{ V} / 690 \text{ V}^* \text{ or } 200 \text{ V}$

Electricity supply 60 Hz 400V / 690V* or 200V Motor Power 50 Hz 15 kW / 20 hp Motor Power 60 Hz 18.5 kW / 25 hp Noise 50 Hz 80 dB(A) Noise 60 Hz 83 dB(A) Weight 525 kg / 1155 lbs Oil capacity 15 liter / 3.96 US gal

Oil Type UG20

Product Description	Order No.
EV630 200V, 50/60Hz	A35050934
EV630 400/690V, 50/60Hz	A35050940

Accessories for Single Stage Oil Sealed Pumps

Oil Level Switch

An oil level switch is available to order as a separate item that can be fitted to give an indication or warning of low oil level in the pump. This allows the user to remotely monitor the oil level and add oil or plan maintenance to prevent potentially serious damage occurring to the pump.

Ordering Information

Product Description	Order No.
Oil level switch EV20, EV40	A35010300
Oil level switch EV70, EV100, EV160, EV200, EV300, EV400, EV630	A35020300

Inlet Filter

A full range of inlet filters for all models are available for use when there is the possibility of harmful dust or debris entering the pump during operation and potentially causing damage or increased wear to the pump mechanism.

Ordering Information

Product Description	Order No.
Inlet filters complete with fittings	
Inlet filter EV20	A35010310
Inlet filter EV40	A35015310
Inlet filter EV70, EV100	A35025310
Inlet filter EV160, EV200, EV300	A35030310
Inlet filter EV400, EV630	A35045310
Spares	Order No.
Inlet filter element EV20	A35010700
Inlet filter element EV40	A35015700
Inlet filter element EV70, EV100	A35025700
Inlet filter element EV160, EV200, EV300	A35030700
Inlet filter element EV400, EV630	A35045700
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Spares

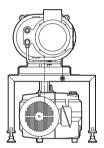
Three levels of spares kits are available. Filter kit containing exhaust mist filters, Service kit containing filter kit, seals and blades and an Overhaul kit containing service kit and parts to completely rebuild a pump such as bearings, etc.

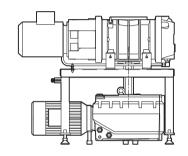
Filter kit EV20 Service kit EV20 A35010810 Overhaul kit EV20 A35010820 Filter kit EV40 A35015800 Service kit EV40 A35015810 Overhaul kit EV40 A35015820 Filter kit EV70 A35020800 Service kit EV70 A35020810 Overhaul kit EV70 A35020810 Overhaul kit EV70 A35020820 Filter kit EV100 A35025800 Service kit EV100 A35025800 Service kit EV100 A35025810 Overhaul kit EV100 A35025810 Overhaul kit EV100 A35030820 Filter kit EV160 A35030820 Filter kit EV160 A35030820 Filter kit EV160 A35030820 Filter kit EV160 A35030820 Filter kit EV200 A35035810 Overhaul kit EV200 A35035820 Filter kit EV200 A35035820 Filter kit EV300 A35035820 Filter kit EV300 A35040800 Service kit EV300 A35040800 Service kit EV300 A35040800 Service kit EV400 A35045820 Filter kit EV400 A35045820 Filter kit EV400 A35045820 Filter kit EV630 A35050800 Service kit EV630 A35050800 Service kit EV630 A35050820	Spares	Order No.
Overhaul kit EV20 A35010820 Filter kit EV40 A35015800 Service kit EV40 A35015810 Overhaul kit EV40 A35015820 Filter kit EV70 A35020800 Service kit EV70 A35020810 Overhaul kit EV70 A35020820 Filter kit EV100 A35025800 Service kit EV100 A35025820 Filter kit EV160 A35030800 Service kit EV160 A35030800 Service kit EV160 A35030820 Filter kit EV200 A35035800 Service kit EV200 A35035800 Service kit EV200 A35035820 Filter kit EV300 A35040800 Service kit EV300 A35040800 Service kit EV300 A35040800 Service kit EV400 A35045800 Service kit EV400 A35045820 Filter kit EV630 A35050800 Service kit EV630 A35050810	Filter kit EV20	A35010800
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	Filter kit EV630	A35050800
Overhaul kit EV630 A35050820	Service kit EV630	A35050810
	Overhaul kit EV630	A35050820

EV Single Stage Oil Sealed Pump Combinations

Our comprehensive range of EV pumps and mechanical boosters, complete with connection kits to mount the mechanical booster allows the user to specify a complete system. The fitting of a mechanical booster to an EV rotary vane pump significantly increases pumping speed and vacuum performance of the system, as well as increasing the ultimate vacuum attainable by approximately one decade of pressure.

Specifying a combination is simply a process of selecting the EV pump, selecting the required mechanical booster (from catalog) and the appropriate connection kit shown below. The connection kits are supplied as a kit of parts that allows them to be easily assembled, together with the EV pump and mechanical booster on site. Clear and concise instructions are included with the kits to make this a very simple process.







Ordering Information Booster Connections

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8

				Во	oster				
Primary pump	EH250	EH500	EH1200	607MV05	EH2600	615MV10 61BMV10	EH4200	615MV15 61BMV25	622MV25
EV100	NR7001000	NR7002000	NR7003000	NR7046000					
EV100 50 Hz		NRD236000	NRD238000						
EV100 60 Hz		NRD237000	NRD239000						
EV160		NR7006000	NR7007000	NR7047000		NR7050000			
EV200		NR7010000	NR7011000			NR7050000			
EV300		NR7014000	NR7015000		NR7016000	NR7050000	NR7017000	NR7050000	
EV300 50 Hz			NRD240000		NRD242000				
EV300 60 Hz			NRD241000		NRD243000				
EV400			NR7021000		NR7022000	NR7056000	NR7023000	NR7056000	
EV630			NR7028000		NR7029000	NR7056000	NR7030000	NR7056000	NR7064000
T			and the same and						

To ensure that both pumps and connecting kits are ordered:

Select the required EV pump - order as individual item

Select the required mechanical booster - order as individual item

Select the connection kit required to mount the booster on the EV pump from the table above - order as individual item

The three components will be supplied packed individually for assembly on receipt. The mounting kit contains simple instructions detailing the operations required to assemble the mounting kit and how to connect both the EV and mechanical booster together as a system.

EH Mechanical Booster Pumps



The EH mechanical booster pumps feature the unique hydrokinetic drive, providing an efficient power transmission with benefits in economy, performance and compactness. The hydrokinetic drive provides the following features:

- Pump down times cut by 50%, when compared with direct drive pumps
- · No bypass lines or pressure switches required
- Universal voltage motors
- · Reduced capital and operating costs
- Air cooled motors with water cooled options
- · Quiet, minimum vibration

The EH mechanical booster pumps, based on the simple Roots principle, remain the favorite pumps for applications where high pumping speeds over 3000 m³h⁻¹ / 1776 ft³min⁻¹ are required in the pressure region of 0.01 to 50 mbar / 0.0075 to 37.5 Torr. These pumps must always be backed by another pump which can deliver against a high pressure differential to atmospheric pressure.

Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.

High Performance Pumping Mechanism

The EH has a high quality, oil-free pumping mechanism. This offers:

- · Quiet, vibration free operation
- · Rugged and corrosion resistant
- Advanced shaft-seal technology no oil contamination of process chamber

The corrosion resistant pumping mechanism is manufactured from high grade cast iron. The proven shaft-seal arrangement ensures that no oil enters the pumping stator, and the absence of internal and external by-pass lines and valves which may corrode or stick minimizes maintenance requirements.

The design of the shaft seals is optimized to ensure that no lubricants can migrate into the pumping mechanism. This maintains booster pump performance in applications which demand the highest standard of cleanliness. In addition, this prevents the build-up of trapped particles on the rotor lobes and end-faces which have very close tolerances.

The dynamically balanced rotors and precision ground gears contribute to the smooth, quiet operation of the pumps, as demanded by manufacturers of advanced technology equipment.

Broad Application Coverage

EH mechanical boosters are available to cover a broad range of industrial and chemical process applications.

Industrial

Industrial EH boosters are safe to handle non-flammable gases and vapors within the normal operating parameters of the booster.

ATEX

ATEX classified EH boosters are annotated with the suffix "T3" or "T160".

- EH boosters may be supplied with ATEX classification either as part of a pump system or stand-alone, on application. Please consult Edwards.
- ATEX compliance is typically specified for use in Europe, but may also be required in other areas.

ATEX compliant EH boosters are suitable for operation in ATEX systems rated as follows:

All of the EH1200C, EH1200 T160, EH2600C, EH2600 T3, EH2600 T160, EH4200C, EH4200 T3 and EH4200 T160 chemical EH pumps are fitted with flameproof motors:

- Pumps suitable for 50 Hz operation are fitted with a flameproof motor approved to EEx d. Gas Group IIA, IIB, Temperature Class T4.
- Pumps suitable for 60 Hz operation are fitted with a flameproof motor approved to CSA, Division 1 area, Gas Class I Group C & D, and Dust Class II Group F & G, Temperature Class T3C.

Internal and External Classifications

(Ex) II 2G c IIB T3

or

⟨∑⟩ II 2G c IIB T160

The notations used in these ratings are as follows:

Symbol	Meaning
(Ex)	Specifies that the chemical EH pump can be used in a potentially explosive atmosphere
II	Equipment group II
2 G	Equipment category 2 (gas)
С	Constructional safety
IIB	Suitable to pump gas group IIB
T3 / T160	Gas auto-ignition temperature

Equipment Category

For equipment category 1 (gas) consult Edwards.

Gas Auto-Ignition Temperature

The temperature classifications applied to the chemical EH pumps relate to the auto-ignition temperature of flammable materials that can be pumped:

- The EH1200C, EH2600C, EH4200C and chemical EH pumps that have a T3 classification are suitable for pumping flammable materials that have an auto-ignition temperature greater than
- Chemical EH pumps that have a T160 classification are suitable for pumping flammable materials that have an auto-ignition temperature greater than 160 °C.

Explosion Proof

Explosion proof boosters are annotated with the suffix "C".

- EH boosters may be ordered with explosion proof motors either individually, or as part of an explosion proof system.
- Explosion proof is generally applicable in N. America and the rest of the world (excluding Europe).

Explosion-proof boosters will be supplied fitted with an explosion-proof motor (suitable for 60 Hz operation) approved to CSA, Division 1 area, Gas Class I Group C & D and Dust Class II Group F & G, Temperature Class T3C.

EH Pumps with Hydrokinetic Drive

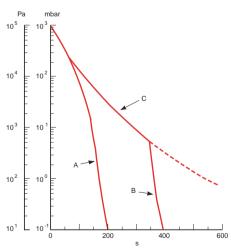
EH booster pumps have a unique and patented hydrokinetic fluid drive, which couples the motor to the pumping mechanism. The hydrokinetic drive offers the following advantages:

- Pump down times cut by up to 50%
- · Reduced capital and operating costs
- · No pressure sensors, by-pass lines or valves
- Can operate continuously at all pressures when used with a backing pump

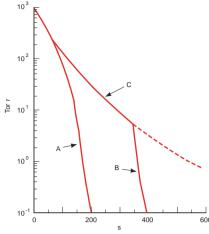
EH booster pumps have universal voltage, air-cooled motors and are available with effective pumping speeds of up to 4140 $\rm m^3h^{-1}$ / 2440 $\rm ft^3min^{-1}$. The pump bodies of the EH1200, EH2600 and EH4200 pumps are water-cooled.

Two versions of each EH booster pump are available, with different oils used for the lubrication of the seals and gears. The standard version uses mineral oils, such as Ultragrade 20. The alternative version has PFPE (perfluoropolyether) oils and is suitable for applications where oxygen or other reactive and corrosive gases are processed.

Pump-Down Times cut by up to 50% The hydrokinetic drive allows the booster pump to be started at the same time as the backing pump (at atmospheric pressure) as it prevents motor overload. The EH booster pump therefore assists the pumping process from the start of pump-down. In comparison pumping systems with conventional, direct drive mechanical booster pumps (where the booster pump is switched on when the chamber pressure has been reduced to, typically, less than 10 mbar / 7.5 Torr), the total evacuation time can be reduced by as much as 50%. The graph below shows data for a 2.8 m³ / 100 ft³ chamber, with a 2600 m³h⁻¹ / 2600 ft³min⁻¹ mechanical booster pump and a 255 m³h⁻¹ / 150 ft³min⁻¹ backing pump.



- A With backing pump and EH mechanical booster pump switched on together
- B With mechanical booster pump switched on at 5 mbar
- C With backing pump only (pumping through booster pump)



- A With backing pump and EH mechanical booster pump switched on together
- 3 With mechanical booster pump switched on at 5 mbar
- With backing pump only (pumping through booster pump)

Automatic Overload Protection The hydrokinetic drive automatically varies the rotational speed of the pump. This protects the motor from overload, prevents over-heating, and allows the pump to operate with high pressure differentials. Consequently, EH booster pumps are not damaged by sudden increases of inlet pressure and even by the entry of solid debris into the pump.

Important Cost Savings When you use EH mechanical booster pumps, you save money on installation and operation. Your capital costs are reduced as you do not need valves, by-pass lines and pressure switches, and you can use a smaller backing pump than with conventional drive booster pumps. Operation costs are reduced because EH booster pumps have smaller motors than direct drive pumps and, when operating at full speed, they use only a fraction of the rated power.

EH250 Mechanical Booster Pump

The EH mechanical booster pump, based on the simple Roots principle, remains the favourite pump for applications where high pumping speeds are required for pressures in the region of 0.01 to 10 mbar. This pump must always be backed by another pump, which can deliver against a high-pressure differential to atmospheric pressure.

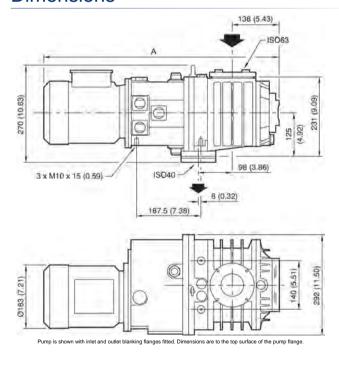
Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.



Features & Benefits

- Suitable for applications where high pumping speeds over 3000 m h -1/1776 ft min are required in the pressure region of 0.01 to 50 mbar/0.0075 to 37.5 Torr.
- Operating at relatively low pressures makes it highly reliable.
- The EH pumps have a high quality, oil-free pumping mechanism.
 This offers:
- · Quiet, vibration free operation.
- · Rugged and corrosion resistant.

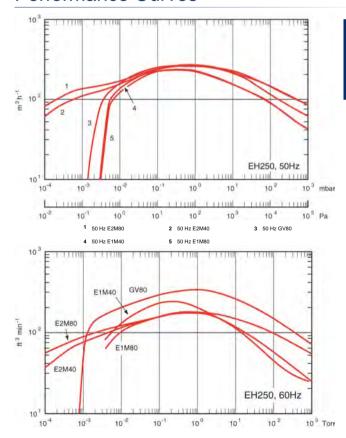
Dimensions



Applications

- Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel de-gassing
- Thin film coating

Performance Curves



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Technical Data

Displacement (swept volume)	
50Hz	310 m ³ h ⁻¹ / 185 ft min ⁻¹
60Hz	375 m ³ h ⁻¹ / 220 ft min -1
Effective pumping speed with backing pump	
E1M40 or E2M40	240 m ³ h ⁻¹ / 141 ft min ⁻¹
E1M80 or E2M80	274 m ³ h ⁻¹ / 161 ft min ⁻¹
Pressure differential across pump	
50Hz	0-180 mbar / 0-140 Torr
60Hz	0-150 mbar / 0-115 Torr
Inlet connection	ISO63
Outlet connection	ISO40
Rotational speed ‡	
50Hz	0-2900 rpm
60Hz	0-3500 rpm
Operating continuous inlet pressure	0-1000 mbar / 0-760 Torr
Maximum outlet pressure	1000 mbar / 760 Torr
Recommended backing pumps	GV80, E1M/E2M40, E1M/E2M80
Electrical supply voltage, 3-ph	
50Hz	220 - 240V / 380 - 415V
60Hz	208-230V / 460V
Motor power	
Hydrocarbon	2.2 kW / 3 hp
PFPE	1.5 kW / 2 hp
ATEX	2.2 kW
Explosion proof	3 hp
Ambient temperature range	
Operating	5 to 40°C / 40 to 104°F
Storage	-10 to 80°C / 14 to 176°F
Maximum operating humidity	90% RH
Cooling method	Air cooled
Recommended oil	Ultragrade 20
Oil capacity	
Coupling cover	1.5 liter / 1.6 qt
Shaft seal reservoir	0.125 liter / 0.25 qt
Weight	61 kg / 124 lb
	61 kg / 134 lb

Product Description	Order No.
EH250IND 200V, 3-ph, 60Hz, 3hp	NRC221000
EH250IND 200V, 3-ph, 50Hz, 2.2kW	NRC222000
EH250IND 220-240/380-415V, 3-ph, 50Hz, 2.2kW	A30151945
EH250IND 208 – 230V or 460V, 3-ph, 60Hz, 3 hp	A30152946
PFPE EH250FX 220-240/380-415V, 3-ph, 50Hz, 1.5kW	A30153935
PFPE EH250FX 208-230/460V, 3-ph, 60Hz, 2 hp	A30154936
EH250C 460V, 3-ph 60Hz, 3 hp	NRA997000
EH250T160 220-240/380-415V, 3-ph 50Hz, 2.2kW	NRA996000
Accessories & Spares	Order No.
Spares Kit Con C&O EH/QMB250/500A	A30151815
Spares Kit Module EH/QMB250/500A	A30151820
Spares Kit Shim EH/QMB250/500A	A30151825
Inlet Mesh Assy 3.3 mm ISO63	A60041029
ISO63 Screen Centring S/S Viton	C10521085

EH500 Mechanical booster pump

The EH mechanical booster pump, based on the simple Roots principle, remains the favourite pump for applications where high pumping speeds are required for pressures in the region of 0.01 to 10 mbar. This pump must always be backed by another pump, which can deliver against a high-pressure differential to atmospheric pressure.

Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.

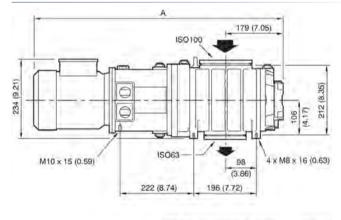


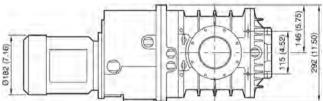
Industrial EH mechanical booster pumps are safe to handle non-flammable gases and

Features & Benefits

- Suitable for applications where high pumping speeds over 3000 m h -1/1776 ft min are required in the pressure region of 0.01 to 50 mbar/0.0075 to 37.5 Torr.
- Operating at relatively low pressures makes it highly reliable.
- The EH pumps have a high quality, oil-free pumping mechanism.
 This offers:
- Quiet, vibration free operation.
- Rugged and corrosion resistant.

Dimensions



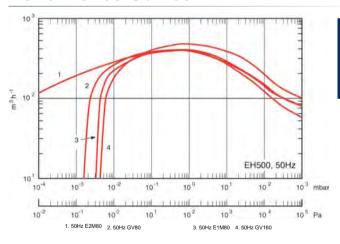


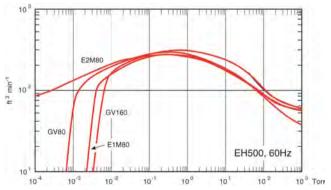
Pump is shown with inlet and outlet blanking flanges fitted. Dimensions are to the top surface of the pump flanger

Applications

- Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel de-gassing
- Thin film coating

Performance Curves





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Technical Data

Displacement (swept volume)	
50Hz	505 m ³ h ⁻¹ / 300 ft ³ min ⁻¹
60Hz	605 m ³ h ⁻¹ / 335 ft ³ min ⁻¹
Effective pumping speed with backing pump	, , , , , , , , , , , , , , , , , , , ,
E1M40 or E2M40	350 m ³ h ⁻¹ / 206 ft min ⁻¹
E1M80 or E2M80	400 m ³ h ⁻¹ / 236 ft ³ min ⁻¹
E1M175 or E2M175	440 m ³ h ⁻¹ / 259 ft ³ min ⁻¹
E1M275 or E2M275	460 m h / 271 ft min
Pressure differential across pump †	
50Hz	0-110 mbar / 0-83 Torr
60Hz	0-90 mbar / 0-68 Torr
Inlet connection	ISO100
Outlet connection	ISO63
Rotational speed	
50Hz	0-2900 rpm
60Hz	0-3500 rpm
Operating continuous inlet pressure	0-1000 mbar / 0-760 Torr
Maximum outlet pressure	1000 mbar / 760 Torr
Recommended backing pumps	GV80, E2M80
Electrical supply	
50Hz	220-240V / 380-415V
60Hz	208-230V / 460V
Motor power	
Hydrocarbon	2.2kW / 3hp
PFPE	1.5 kW / 2hp
ATEX	2.2kW
Explosion proof	3hp
Ambient temperature range	5 to 4000 / 40 to 40405
Operating	5 to 40°C / 40 to 104°F
Storage	-10 to 80°C / 14 to 176°F
Maximum operating humidity	90% RH
Cooling method Recommended oil	Air cooled
Standard version	Llltragrade 20
PFPE version	Ultragrade 20 Fomblin® YVAC 16/6
Oil capacity	I OHIDHING I VAC 10/0
Coupling cover	1.5 liter / 1.6 qt
Shaft seal reservoir	0.125 liter / 0.25 qt
Weight	74 kg / 163 lb
· · o.g.n	, , ng / 100 ib

†. Depends on pressure

Product Description	Order No.
EH500IND 208-230/4640V, 3-ph, 60Hz, 2.2kW	A30272946
EH500IND 200V, 3-ph 60Hz, 3 hp	NRC219000
EH500IND Mechanical Booster Pump 2.2kW 200V 3ø 50 Hz	NRC220000
EH500IND 200V, 3-ph, 50Hz, 2.2kW	A30271945
EH500AFX 220-240/380-415V, 3-ph 50Hz, 1.5 kW	A30273935
EH500AFX 208-230/460V, 3-ph, 60Hz, 2 hp	A30274936
EH500C 460V, 3-ph, 60Hz, 3 hp	NRA999000
EH500T3 220-240/380-415V, 3-ph, 50Hz, 2.2kW	NRA998000
Accessories & Spares	Order No.
Spares Kit Con C&O EH/QMB250/500A	A30151815
Spares Kit Module EH/QMB250/500A	A30151820
Spares Kit Shim EH/QMB250/500A	A30151825
ISO100 Screen Centring S/S Viton	C10523085
Inlet Mesh Assembly EH250/EH500A	A60041569

EH1200 Mechanical booster pump

The EH mechanical booster pump, based on the simple Roots principle, remains the favourite pump for applications where high pumping speeds are required for pressures in the region of 0.01 to 10 mbar. This pump must always be backed by another pump, which can deliver against a high-pressure differential to atmospheric pressure.

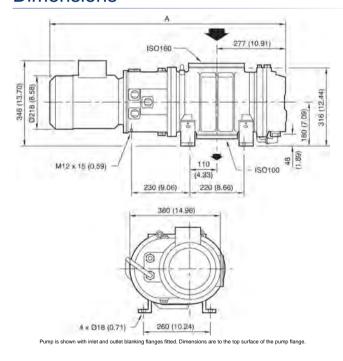
Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.



Features & Benefits

- Suitable for applications where high pumping speeds over 3000 m h -1/1776 ft min are required in the pressure region of 0.01 to 50 mbar/0.0075 to 37.5 Torr.
- Operating at relatively low pressures makes it highly reliable.
- The EH pumps have a high quality, oil-free pumping mechanism.
 This offers:
- Quiet, vibration free operation.
- Rugged and corrosion resistant.

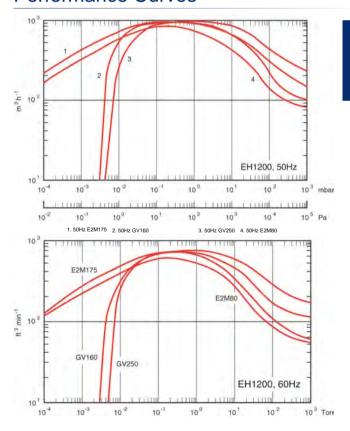
Dimensions



Applications

- · Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel de-gassing
- Thin film coating

Performance Curves



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PFPE version

Coupling cover

Shaft seal reservoir

Oil capacity

Gear case

Weight

Technical Data

Displacement (swept volume)	
50Hz	1195 m h ¹ / 715 ft min ⁻¹
60Hz	1435 m h ³ / 845 ft min ³
Effective pumping speed with backing pump	
E1M80 or E2M80	840 m ³ h ⁻¹ / 495 ft ³ min ⁻¹
E1M175 or E2M175	930 m h ⁻¹ / 548 ft min ⁻¹
E1M275 or E2M275	$1020 \mathrm{m}^3 \mathrm{h}^{-1} / 601 \mathrm{ft}^3 \mathrm{min}^{-1}$
Pressure differential across pump †	
50Hz	0-90 mbar / 0-68 Torr
60Hz	0-75 mbar / 0-56 Torr
Inlet connection	ISO160
Outlet connection	ISO100
Rotational speed	
50Hz	0-2900 rpm
60Hz	0-3500 rpm
Operating continuous inlet pressure	0-1000 mbar / 0-760 Torr
Maximum outlet pressure	1000 mbar / 760 Torr
Recommended backing pumps	GV160, GV250, E2M80, E2M175
Electrical supply	
50Hz	220-240V / 380-415V
60Hz	208-230V / 460V
Motor power	
Hydrocarbon	3kW / 4hp
PFPE	3kW / 4hp
ATEX	3kW
Explosion proof	4hp
Ambient temperature range	
Operating	5 to 40°C / 40 to 104°F
Storage	-10 to 80°C / 14 to 176°F
Maximum operating humidity	90% RH
Recommended cooling water flow (inlet temperature 20°C)*	120lh ⁻¹ / 0.53 gal min ⁻¹
Recommended cooling water supply pressure*	2-6 bar
Cooling water connections*	3/8 inch BSP male
Recommended oil	
Standard version	Ultragrade 20

Fomblin® YVAC 16/6

1.25 liter / 1.3 qt

1.5 liter / 1.6 qt

74 kg / 163 lb

0.125 liter / 0.25 qt

Product Description	Order No.
EH1200IND 220-240/380-415V, 3-ph, 50Hz, 3kW	A30590935
EH1200IND 208-230/460V, 3-ph, 60Hz, 4 hp	A30591936
EH1200IND 200V, 3-ph, 60Hz, 4 hp	NRC217000
EH1200IND 200V, 3-ph, 50Hz, 3 kW	NRC218000
EH1200FX 220-240/380-415V, 3-ph, 50Hz, 3 kW	A30592935
EH1200FX 208-230/460V, 3-ph, 60Hz, 4 hp	A30593936
EH1200C 230/460V, 3-ph, 60Hz, 4 hp	A30556982
EH1200T160 380-415V, 3-ph, 50Hz, 3kW	A30557900
Accessories & Spares	Order No.
Spares Kit Con C&O EH/QMB1200	A30551815
Spares Kit Module EH/QMB1200	A30551820
Shim kit	A30551825
ISO160 Screen Centring S/S Viton	C10524085
Inlet Mesh Assembly EH2600/EH4200	A60041570

^{*} Under many circumstances, pumps may operate without cooling water. Apply to Edwards for more information.
†. Depends on pressure

EH2600 Mechanical booster pump

The EH mechanical booster pump, based on the simple Roots principle, remains the favourite pump for applications where high pumping speeds are required for pressures in the region of 0.01 to 10 mbar. This pump must always be backed by another pump, which can deliver against a high-pressure differential to atmospheric pressure.

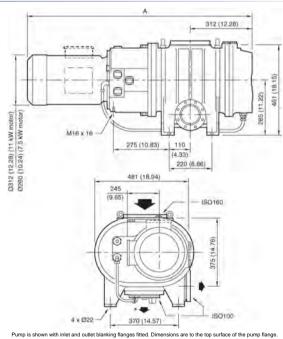
Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.



Features & Benefits

- Suitable for applications where high pumping speeds over 3000 m h⁻¹/1776 ft min⁻¹ are required in the pressure region of 0.01 to 50 mbar/0.0075 to 37.5 Torr.
- Operating at relatively low pressures makes it highly reliable.
- The EH pumps have a high quality, oil-free pumping mechanism.
 This offers:
- Quiet, vibration free operation.
- · Rugged and corrosion resistant.

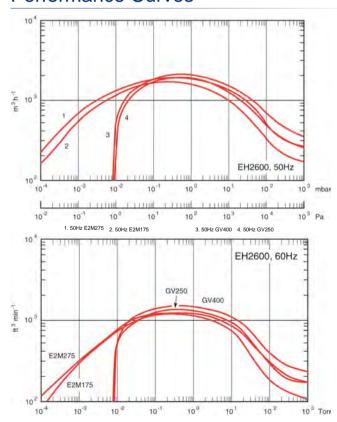
Dimensions



Applications

- · Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel de-gassing
- . Thin film coating

Performance Curves



8

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Technical Data

Displacement (swept volume)	
50Hz	2590 m ³ h ⁻¹ / 1525 ft min ⁻¹
60Hz	3110 m ³ h ⁻¹ / 1830 ft min ⁻¹
Effective pumping speed with backing pump	
E2M175	1750 m ³ h ⁻¹ / 1031 ft ³ min ⁻¹
E2M275	1900 m ³ h ⁻¹ / 1119 ft min ⁻¹
Pressure differential across pump †	
50Hz	0-80 mbar / 0-60 Torr
60Hz	0-67 mbar / 0-50 Torr
Inlet connection	ISO160
Outlet connection	ISO100
Rotational speed	
50Hz	0-2900 rpm
60Hz	0-3500 rpm
Operating continuous inlet pressure	0-1000 mbar / 0-760 Torr
Maximum outlet pressure	1000 mbar / 760 Torr
Recommended backing pumps	GV250, GV400, E2M175, E2M275
Electrical supply	
50Hz	220-240V / 380-415V
60Hz	208-230V / 460V
Motor power	
Hydrocarbon	11kW / 15hp
PFPE	7.5kW / 10hp
ATEX	11kW
Explosion proof	15hp
Ambient temperature range	
Operating	5 to 40°C / 40 to 104°F
Storage	-10 to 80°C / 14 to 176°F
Maximum operating humidity	90% RH
Recommended cooling water flow (inlet temperature 20°C)*	250lh ⁻¹ / 1.1 gal min ⁻¹
Recommended cooling water supply pressure*	2-6 bar
Cooling water connections*	3/8 inch BSP male
Recommended oil	
Standard version	Ultragrade 20
PFPE version	Fomblin® YVAC 16/6
Oil capacity	
Gear case	3.5 liter / 3.3 qt
<u> </u>	

Ordering Information

Product Description	Order No.
EH2600IND 380-415V, 3-ph, 50Hz, 11 kW	A30775946
EH2600IND 230/460V, 3-ph, 60Hz, 15 hp	A30776982
EH2600IND 200V, 3-ph, 60Hz, 15 hp	NRB989000
EH2600IND 200V, 3-ph, 50Hz, 11 kW	NRC216000
EH2600FX 220-240/380-415V, 3-ph, 50Hz, 7.5kW	A30753935
EH2600FX 208-230/460V, 3-ph, 60Hz, 10 hp	A30754936
EH2600C 230/460V, 3-ph, 60Hz, 15 hp	A30756982
EH2600T3 380-415V, 3-ph, 50Hz, 11 kW	A30741935
EH2600T160 380-415V, 3-ph, 50Hz, 11 kW	A30779900
Accessories & Spares	Order No.
Spares Kit Con C&O EH/QMB26/4200	A30751815
Spares Kit Module EH/QMB26/4200	A30751820
Spares Kit Shim EH/QMB12/26/4200	A30751825
ISO160 Screen Centring S/S Viton	C10524085
Inlet Mesh Assembly EH2600/EH4200	A60041570

6.5 liter / 7 qt

1.5 liter / 1.4 qt 308 kg / 679 lb

Coupling cover

Weight

Shaft seal reservoir

^{*} Under many circumstances, pumps may operate without cooling water. Apply to Edwards for more information.
†. Depends on pressure

EH4200 Mechanical booster pump

The EH mechanical booster pump, based on the simple Roots principle, remains the favourite pump for applications where high pumping speeds are required for pressures in the region of 0.01 to 10 mbar. This pump must always be backed by another pump, which can deliver against a high-pressure differential to atmospheric pressure.

Operating at relatively low pressures, the mechanical booster pump is not exposed to the same concentrations of corrosive process media as is the backing pump, which makes it highly reliable.



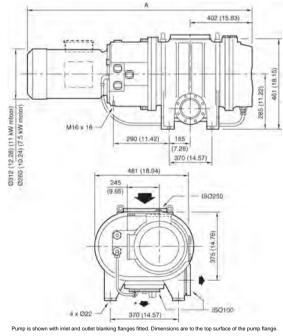
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Features & Benefits

- Suitable for applications where high pumping speeds over 3000 m³h⁻¹/1776 ft³min⁻¹ are required in the pressure region of 0.01 to 50 mbar/0.0075 to 37.5 Torr.
- Operating at relatively low pressures makes it highly reliable.
- The EH pumps have a high quality, oil-free pumping mechanism. This offers:
- Quiet, vibration free operation.
- Rugged and corrosion resistant.

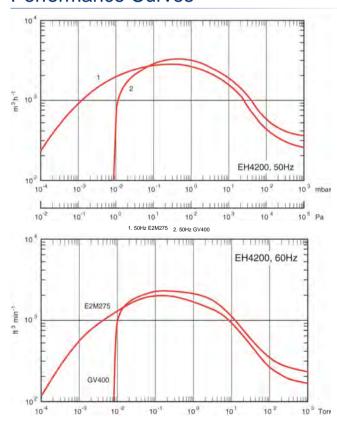
Dimensions



Applications

- Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel de-gassing
- Thin film coating

Performance Curves



Technical Data

roominoar Bata	
Displacement (swept volume)	
50Hz	4140 m h ⁻¹ / 2440 ft min ⁻¹
60Hz	4985 m h ¹ / 2935 ft min ⁻¹
Effective pumping speed with backing pump	1000 III II / 2000 II IIIII
E2M275	3100 m ³ h ⁻¹ / 1825 ft min ⁻¹
Pressure differential across pump †	
50Hz	0-60 mbar / 0-45 Torr
60Hz	0-50 mbar / 0-38 Torr
Inlet connection	ISO250
Outlet connection	ISO100
Rotational speed	
50Hz	0-2900 rpm
60Hz	0-3500 rpm
Operating continuous inlet pressure	0-1000 mbar / 0-760 Torr
Maximum outlet pressure	1000 mbar / 760 Torr
Recommended backing pumps	GV400, E2M275
Electrical supply	
50Hz	220-240V / 380-415V
60Hz	208-230V / 460V
Motor power	
Hydrocarbon	11kW / 15hp
PFPE	11kW / 15hp
ATEX	11kW
Explosion proof	15hp
Ambient temperature range	
Operating	5 to 40°C / 40 to 104°F
Storage	-10 to 80°C / 14 to 176°F
Maximum operating humidity	90% RH
Recommended cooling water flow (inlet temperature 20°C)*	250lh ⁻¹ / 1.1 gal min ⁻¹
Recommended cooling water supply pressure*	2-6 bar
Cooling water connections*	3/8 inch BSP male
Recommended oil	
Standard version	Ultragrade 20
PFPE version	Fomblin® YVAC 16/6
Oil capacity	
Gear case	3.5 liter / 3.3 qt
Coupling cover	6.5 liter / 7 qt

^{*} Under many circumstances, pumps may operate without cooling water. Apply to Edwards for more information.
†. Depends on pressure

1.5 liter / 1.4 qt

400 kg / 882 lb

Shaft seal reservoir

Weight

Product Description	Order No.
EH4200IND 380-415V, 3-ph, 50Hz, 11kW	A30975946
EH4200IND 200V, 3-ph, 60Hz, 15 hp	NRB988000
EH4200IND 200V, 3-ph, 50Hz, 11 kW	NRC215000
EH4200IND 208-230/460V, 3-ph, 60Hz, 15 hp	A30976982
EH4200C 230/460V, 3-ph, 60Hz, 15 hp	A30956982
EH4200T3 380-415V, 3-ph, 50Hz, 11 kW	A30941935
EH4200T160 380-415V, 3-ph, 50Hz, 11 kW	A30979900
Accessories & Spares	Order No.
Spares Kit Con C&O EH/QMB26/4200	A30751815
Spares Kit Module EH/QMB26/4200	A30751820
Spares Kit Shim EH/QMB12/26/4200	A30751825
Inlet Mesh Assembly EH2600	A60041571

Mechanical Booster Pump Accessories

OLM500 Oil Level Monitor

Fit the OLM500 in place of the oil sight-glass on the EH250 and EH500 oil seal reservoirs, and on the EH1200, EH2600 and EH4200 oil seal reservoirs and gear boxes. The OLM500 provides a switched output for remote activation or warning devices. Technical data: 24 V a.c. or d.c., maximum current 0.5 A.

Ordering Information

Product Description	Order No.
OLM500 oil level monitor*	A50434000

^{*} Not suitable for ATEX boosters

Inlet Seal with Mesh Screen

Designed to prevent objects falling into the inlet of our booster pumps, the mesh aperture is 3.3 mm.

Ordering Information

Product Description	Order No.
Inlet seal with mesh screen	
ISO63	C10521085
ISO100	C10523085
ISO160	C10524085

8



Stokes 6" series mechanical boosters are available in sizes 1020-6630 m³h⁻¹ / 612-3900 ft³min⁻¹. Features include:

- Rugged design for reliable and extended operation
- Simple maintenance features incorporated in design
- Vertical or horizontal gas flow
- Options of direct drive motors or bare shaft machines
- Options of by pass technology to reduce pump down time and process isolation seals
- Dynamically balanced impellers

Overview

Used in conjunction with rotary-piston, rotary vane, dry vacuum and liquid ring pumps, Stokes 6" series will increase pumping speed at working pressures and shorten pump down time significantly. Whether your objective is to reduce valuable time from the front end of your pumping cycle, or to substantially boost pumping capacity for high out-gassing applications, the result is the same - significantly reduced cycle times.

Stokes 6" series are compatible with any make or type of vacuum pumping system. The boosters can be mounted separately, or on the inlet of the backing pump. The latter forms a compact integrated package as a mechanical booster system. For even lower-pressure applications, two Stokes 6" series can be used in series with one backing pump. This results in a significantly lower-cost and spacesaving pumping system.

Bypass technology is available in the 615 model to enhance your productivity further, while also assuring consistent, reproducible vacuum processing. The bypass valve limits the maximum differential pressure, enabling the booster to start from atmosphere and provide increased pumping capacity over the full pressure range. Eliminating the electrical pressure switch insures continuous, booster operation regardless of vacuum level.

The 1 11/16 inch extra large shaft diameter engineered into the Stokes 6" series provides the capability for use with higher powered motors, in addition to ensuring a uniquely rugged and durable mechanical booster. The use of higher powered motors in conjunction with the high differential specification, allows the pumps to operate at their full displacement from atmospheric pressure, with appropriately sized backing pumps the 612MB offers these advantages in a standard package.

The Stokes 6" series is also available in a process isolation series (five mechanical seals) for optimum protection from dust and particulate contamination in arduous duty applications.

All mechanical vacuum boosters must be backed by a primary vacuum pump designed to discharge to atmospheric pressure. Below is a list of commonly used backing pumps:

- Oil Sealed Pumps (EM or EV)
- Liquid Ring Pump (Two-stage LR Series)
- Piston Pumps (Stokes Microvac Series)
- Dry Pump (GV Drystar or Chemical Drystar)

Features & Benefits

- · Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high pressures
- Belt drive or direct drive capability flexibility of operating speeds and motor power
- Vertical or horizontal gas flow flexibility of orientation
- Drive end roller bearing resists belt pull and thermal effects
- Over-sized anti-friction bearings increased uptime and longer service intervals
- Rugged proven design and construction
- Air Cooled utility savings
- Unique impeller design -Dynamically balanced to minimize vibration
- High volumetric efficiency optimal performance
- · High differential pressure operation capability
- Available by-pass option for improved pumpdown
- Available process isolation seal option-optimum protection from dust and particulate contamination

Applications

Typical applications for the Stokes 6" series mechanical booster pumps includes:

- Automotive
- Chemical processing
- · Heat treatment
- Leak detection
- Metallurgy
- PET processing
- Pharmaceuticals
- Thermal processing
- Transformer drying and cable fluid conditioning
- Vacuum coating
- Vacuum melting
- · Many other industrial applications

8

Stokes 607 Series Mechanical Booster Pumps

Stokes 6" series mechanical boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. The Stokes 6" series can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster. This allows the pumps to operate at their full displacement from atmospheric pressure with an appropriately sized backing pump.

Features & Benefits

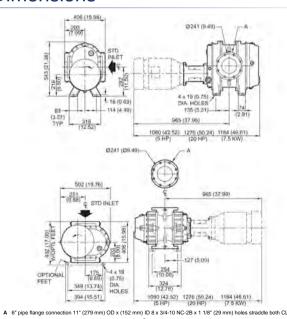
- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high pressures
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Technical Data

Displacement 1589m³ h⁻¹ / 935ft³ min⁻¹ V belt 2750 rpm Direct drive 1800 rpm 1040m h - / 612ft min 1733m³h⁻¹ / 1020ft³min⁻¹ Direct drive 3000 rpm Direct drive 3600 rpm 2080m³ h⁻¹ / 1224ft³ min⁻¹ Inlet/outlet flanges 6" ASA/ANSI 5 / 20hp (7.5kW) Motor power Cooling method Air Cooled Oil capacity (horizontal flow) 1.9liter / 0.51gal Oil capacity (vertical flow) 4.1liter / 1.1gal Max pressure differential 506mbar / 380Torr

Max temp rise 135°C / 275°F
Max discharge temp 191°C / 375°F
Weight bare shaft 215kg / 475lbs
Weight TEFC direct drive 408kg / 900lbs

Dimensions



Ordering Information

Product Description	Order No.
607 MHR CE, 7.5kW, 230/400V, 3-ph, 50Hz	900607MHR601
607 MHR CE, 7.5kW, 200-220V/380V, 3-ph, 50/60Hz	900607MHR602
607 MVR CE, 7.5kW, 230/400V, 3-ph, 50Hz	900607MVR601
607 MVR CE, 7.5kW, 200-220V/380V, 3-ph, 50/60Hz	900607MVR602
607 MHR (Bare shaft) Horizontal flow	900607MHR
607 MVR (Bare shaft) Vertical flow	900607MVR
607 MH20, 20 hp, 230/460V, 3-ph, 60Hz	900607MH20
607 MV05, 5 hp, 230/460V, 3-ph, 60Hz	900607MV05
607 MV20, 20 hp, 230/460V, 3-ph, 60Hz	900607MV20
607 MH05, 5 hp, 230/460V, 3-ph, 60Hz	900607MH05
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

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Stokes 6" series mechanical boosters are designed to be used in conjunction with rotarypiston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. They incorporate five mechanical seals for optimum protection from dust and particulate contamination and can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster.

Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Technical Data

Displacement

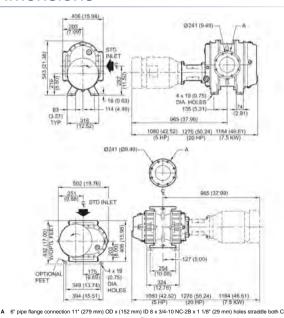
1589m³ h⁻¹ / 935ft³ min⁻¹ V belt (2750 rpm) 1733m³h⁻¹ / 1020ft³min⁻¹ Direct drive (3000 rpm) 2080m³h⁻¹ / 1224ft³min⁻¹ Direct drive (3600 rpm) 6" ASA/ANSI flange Inlet/outlet flanges

7.5kW Motor power EU/Asia Motor power US TEFC 10hp

Cooling water 7.6-11.4l min⁻¹ / 2-3gal min⁻¹

Oil capacity (horizontal flow) 1.9liter / 0.51gal Oil capacity (vertical flow) 4. liter / 1.1gal Max pressure differential 506 mbar / 380 Torr Max temp rise 135°C / 275°F Max discharge temp 191°C / 375°F Weight bare shaft 215kg / 475lbs Weight TEFC direct drive 345kg / 760lbs

Dimensions



Product Description	Order No.
607 5HR CE 7.5kW, 230/400V, 3-ph, 50Hz	9006075HR601
607 5HR CE 7.5kW, 200-220/380V, 3-ph, 50/60Hz	9006075HR602
607 5H10, 10hp, 230/460V, 3-ph, 60Hz	9006075H10
607 5HR (Bare shaft) Horizontal flow	9006075HR
607 5V10, 10hp, 230/460V, 3-ph, 60Hz	9006075V10
607 5VR (Bare shaft) Vertical flow	9006075VR
607 5VR CE 7.5kW, 230/400V, 3-ph, 50Hz	9006075VR601
607 5VR CE 7.5kW, 200-220/380V, 3-ph, 50/60Hz	9006075VR602
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Process isolation seal kit	607552004

Stokes 6" series mechanical boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. The Stokes 6" series can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster. This allows the pumps to operate at their full displacement from atmospheric pressure with an appropriately sized backing pump.

Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high pressures
- Belt drive or direct drive capability
- · Vertical or horizontal gas flow

Technical Data

Disp	lacement
טוט	iaccincin

 V belt (2750 rpm)
 3375m³h⁻¹ / 2000ft³min⁻¹

 Direct drive (1800 rpm)
 2210m³h⁻¹ / 1300ft³min⁻¹

 Direct drive (3000 rpm)
 3685m³h⁻¹ / 2170ft³min⁻¹

 Direct drive (3600 rpm)
 4420m³h⁻¹ / 2600ft³min⁻¹

 Inlet/outlet flanges
 8" ASA/ANSI flange

 Motor power EU/Asia
 11kW

 Motor power US TEFC
 10hp

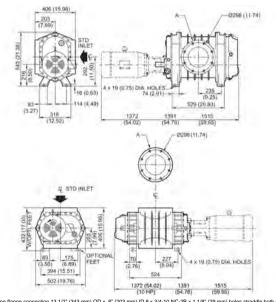
Cooling method
Oil capacity (horizontal flow)
Oil capacity (vertical flow)
Air cooled
1.9liter / 0.51gal
4.1liter / 1.1gal
Max pressure differential
506mbar / 380Torr
Max temp rise
135°C / 275°F
Max discharge temp
191°C / 375°F
Weight bare shaft
234kg / 515 lbs

Weight TEFC direct drive 390kg / 860lbs

Ordering Information

Product Description	Order No.
615 MHR CE 11kW, 400V, 3-ph, 50Hz	900615MHR601
615 MHR CE 11kW, 200-220/380V, 3-ph, 50/60Hz	900615MHR602
615 MV10, 10hp, 230/460V, 3-ph, 60Hz	900615MV10
615 MV15, 10hp, 230/460V, 3-ph, 60Hz	900615MV15
615 MVR (Bare shaft) Vertical flow	900615MVR
615 MVR CE 11kW, 400V, 3-ph, 50Hz	900615MVR601
615 MVR CE 11kW, 200-220/380V, 3-ph, 50/60Hz	900615MVR602
615 MH10, 10hp, 230/460V, 3-ph, 60Hz	900615MH10
615 MH15, 15hp, 230/460V, 3-ph, 60Hz	900615MH15
615 MHR (Bare shaft) Horizontal flow	900615MHR
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Dimensions



A 8" pipe flange connection 13 1/2" (343 mm) OD x 8" (203 mm) ID 8 x 3/4-10 NC-2B x 1 1/8" (29 mm) holes straddle both CL both

Stokes 6" series process isolation boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. They incorporate five mechanical seals for optimum protection from dust and particulate contamination, and can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster. This allows the pumps to operate at their full displacement from atmospheric pressure with an appropriately sized backing pump.

Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Technical Data

Displacement

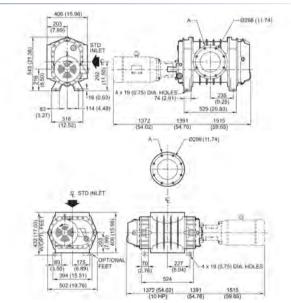
3375m³h⁻¹ / 2000ft³min⁻¹ V belt (2750 rpm) 3685m³h⁻¹ / 2170ft³min⁻¹ Direct drive (3000 rpm) 4420m³h⁻¹/2600ft³min⁻¹ Direct drive (3600 rpm) 8" ASA/ANSI flange Inlet/outlet flanges

11kW Motor power EU/Asia Motor power US TEFC 15hp

Cooling water 7.6-11.4 l min⁻¹ / 2-3 gal min⁻¹

Oil capacity (horizontal flow) 1.9liter / 0.51gal Oil capacity (vertical flow) 4.1liter / 1.1gal Max pressure differential 506mbar / 380Torr Max temp rise 135°C / 275°F Max discharge temp 191°C / 375°F Weight bare shaft 234kg / 515lbs Weight TEFC direct drive 397kg / 875lbs

Dimensions



A 8" pipe flange connection 13 1/2" (343 mm) OD x 8" (203 mm) ID 8 x 3/4-10 NC-2B x 1 1/8" (29 mm) holes straddle both CL both

Product Description	Order No.
615 5HR CE 11kW, 230/400V, 3-ph, 50Hz	9006155HR601
615 5HR CE 11kW, 200-220/380V, 3-ph, 50/60Hz	9006155HR602
615 5H15, 15hp, 230/460V, 3-ph, 60Hz	9006155H15
615 5HR (Bare shaft) Horizontal flow	9006155HR
615 5V15, 15hp, 230/460V, 3-ph, 60Hz	9006155V15
615 5VR (Bare Shaft) Vertical flow	9006155VR
615 5VR CE 11kW, 230/400V, 3-ph, 50Hz	9006155VR601
615 5VR CE 11kW, 200-220/380V, 3-ph, 50/60Hz	9006155VR602
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Process isolation seal kit	607552004

Stokes 61B Series By-Pass Mechanical Booster Pumps

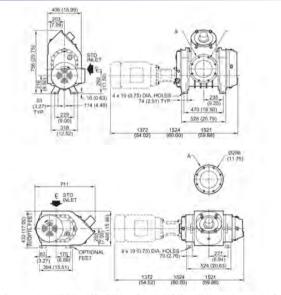
Stokes 61B by-pass mechanical boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. The Stokes 61B by-pass boosters include an integral by-pass valve enabling the booster to start from atmosphere, eliminating the need for a vacuum pressure switch and ensures continuous operation regardless of vacuum level. The Stokes 61B can be mounted separately or on the inlet of the backing pump to create a compact integrated package.



Features & Benefits

- · Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high pressures
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Dimensions



A 8° pipe flange connection 13 1/2° (343 mm) OD x 8° (203 mm) ID 8 x 3/4-10 NC-2B x 1 1/8° (29 mm) holes straddle both CL both

Technical Data

Displacement	
V belt (2750 rpm)	3375m ³ h ⁻¹ / 2000ft ³ min ⁻¹
Direct drive (1800 rpm)	2210m ³ h ⁻¹ / 1300ft ³ min ⁻¹
Direct drive (3000 rpm)	3685m ³ h ⁻¹ / 2170ft ³ min ⁻¹
Direct drive (3600 rpm)	4420m ³ h ⁻¹ / 2600ft ³ min ⁻¹
Inlet/outlet flanges	8" ASA/ANSI flange
Motor power EU/Asia	18.5kW
Motor power US TEFC	10/25hp
By-pass available	Yes
_	

By-pass available Yes

Cooling method Air cooled

Oil capacity (horizontal flow) 1.9liter / 0.51gal

Oil capacity (vertical flow) 4.1liter / 1.1gal

Max temp rise 135°C / 275°F

Max discharge temp 191°C / 375°F

Weight bare shaft 284kg / 625lbs

Weight TEFC direct drive 530kg / 1170lbs

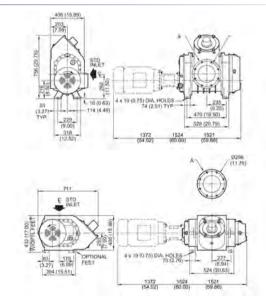
Product Description	Order No.
61B MHR CE, 18.5kW, 400V, 3-ph, 50Hz	90061BMHR601
61B MHR CE, 18.5kW, 200-220/380V, 3-ph, 50/60Hz	90061BMHR602
61B MH10, 10hp, 230/460V, 3-ph, 60Hz	90061BMH10
61B MH25, 25hp, 230/460V, 3-ph, 60Hz	90061BMH25
61B MHR (Bare shaft) Horizontal flow	90061BMHR
61B MV10, 10hp, 230/460V, 3-ph, 60Hz	90061BMV10
61B MV25, 25hp, 230/460V, 3-ph, 60Hz	90061BMV25
61B MVR (bare shaft) Vertical flow	90061BMVR
61B MVR CE, 18.5kW, 400V, 3-ph, 50Hz	90061BMVR601
61B MVR CE, 18.5kW, 200-220/380V, 3-ph, 50/60Hz	90061BMVR602
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 61B series process isolation boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. It incorporates five mechanical seals for optimum protection from dust and particulate contamination. It also includes an integral by-pass valve enabling the booster to start from atmosphere, eliminating the need for a vacuum pressure switch to ensure continuous operation regardless of vacuum level. The Stokes 61B series can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Dimensions



 $\textbf{A} \quad 8" \text{ pipe flange connection 13 1/2" (343 \text{ mm}) OD \times 8" (203 \text{ mm}) ID 8 \times 3/4-10 \text{ NC-2B} \times 1.1/8" (29 \text{ mm}) holes straddle both CL both and the strands of the strands o$

Technical Data

Displacement	
V belt (2750 rpm)	3375m ³ h ⁻¹ / 2000ft ³ min ⁻¹
Direct drive (3000 rpm)	3685m ³ h ⁻¹ / 2170ft ³ min ⁻¹
Direct drive (3600 rpm)	4420m ³ h ⁻¹ / 2600ft ³ min ⁻¹
Inlet/outlet flanges	8" ASA/ANSI flange
Motor power EU/Asia	18.5kW
Motor power US TEFC	25 hp

By-pass available Yes

7.6-11.4l min⁻¹ / 2-3gal min⁻¹ Cooling water

Oil capacity (horizontal flow) 1.9liter / 4.1gal Oil capacity (vertical flow) 4.1liter / 8.8gal Max temp rise 135°C / 275°F 191°C / 375°F Max discharge temp Weight bare shaft 284kg / 625lbs Weight TEFC direct drive 538kg / 1185lbs

Product Description	Order No.
61B 5HR CE 18.5kW, 230/400V, 3-ph, 50Hz	90061B5HR601
61B 5HR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	90061B5HR602
61B 5H25, 25hp, 230/460V, 3-ph, 60Hz	90061B5H25
61B 5HR (Bare Shaft) Horizontal flow	90061B5HR
61B 5V25, 25hp, 230/460V, 3-ph, 60Hz	90061B5V25
61B 5VR (Bare shaft) Vertical flow	90061B5VR
61B 5VR CE 18.5kW, 230/400V, 3-ph, 50Hz	90061B5VR601
61B 5VR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	90061B5VR602
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002
Process isolation seal kit	607552004

Stokes 622 Series Mechanical Booster Pumps

Stokes 6" series mechanical boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. The Stokes 6" series can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster. This allows the pumps to operate at their full displacement from atmospheric pressure with an appropriately sized backing pump.



Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high pressures
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Technical Data

Disp	lacement
טוט	iaccincin

V belt (2750 rpm) 5100m³ h⁻¹ / 3000ft min ⁻¹
Direct drive (3000 rpm) 5525m³ h⁻¹ / 2350ft min ⁻¹
Direct drive (3600 rpm) 6630m³ h⁻¹ / 3900ft min ⁻¹
Inlet/outlet flanges 8" ASA/ANSI flange
Motor power EU/Asia 18.5kW
Motor power US TEFC 25hp
Cooling method Air cooled

Oil capacity (horizontal flow)

Oil capacity (vertical flow)

Max pressure differential

Max temp rise

Max discharge temp

1.9liter / 0.51gal

4.1liter / 1.1gal

333mbar / 250Torr

151°C / 275°F

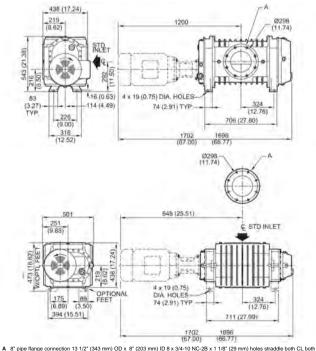
177°C / 350°F

Weight bare shaft

335kg / 740lbs

Weight TEFC direct drive 617kg / 1360lbs

Dimensions



A 8" pipe flange connection 13 1/2" (343 mm) OD x 8" (203 mm) ID 8 x 3/4-10 NC-2B x 1 1/8" (29 mm) holes straddle both CL both flanges

Product Description	Order No.
622 MHR CE 18.5kW, 400V, 3-ph, 50Hz	900622MHR601
622 MHR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	900622MHR602
622 MVR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	900622MVR602
622 MH25, 25hp, 230/460V, 3-ph, 60Hz	900622MH25
622 MHR (Bare shaft) Horizontal flow	900622MHR
622 MV25, 25hp, 230/460V, 3-ph, 60Hz	900622MV25
622 MVR (Bare shaft) Vertical flow	900622MVR
622 MVR CE 18.5kW, 400V, 3-ph, 50Hz	900622MVR601
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

Stokes 622 Series Process Isolation Boosters



Stokes 6" series process isolation boosters are designed to be used in conjunction with rotary-piston, dry vacuum, rotary vane and liquid ring pumps to increase pumping speed at working pressures and shorten pump down time significantly. They incorporate five mechanical seals for optimum protection from dust and particulate contamination and can be mounted separately or on the inlet of the backing pump to create a compact integrated package.

Featuring an extra large diameter shaft, the Stokes 6" series has the capability for use with higher powered motors in addition to ensuring a uniquely rugged and durable mechanical booster.

Features & Benefits

- Mechanical shaft seal improved life and serviceability
- Ringfeder® keyless gear locking system stronger, faster timing
- Large shaft diameters allowing improved performance at high
- Belt drive or direct drive capability
- Vertical or horizontal gas flow

Technical Data

Displacement

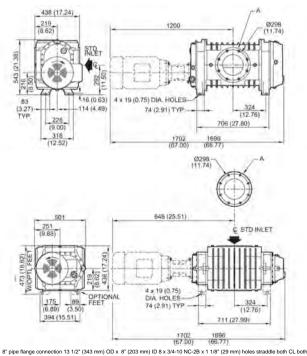
5100m³h⁻¹ / 3000ft³min⁻¹ V belt (2750 rpm) 5525m³h⁻¹ / 2350ft³min⁻¹ Direct drive (3000 rpm) 6630m³h⁻¹ / 3900ft³min⁻¹ Direct drive (3600 rpm) 8" ASA/ANSI flange Inlet/outlet flanges

18.5kW Motor power EU/Asia Motor power US TEFC 25hp

Cooling water 7.6-11.4l min⁻¹ / 2-3gal min⁻¹

Oil capacity (horizontal flow) 1.9liter / 4.1gal Oil capacity (vertical flow) 4.1liter / 8.8gal Max pressure differential 333mbar / 250Torr Max temp rise 121°C / 250°F Max discharge temp 177°C / 350°F Weight bare shaft 335kg / 740lbs Weight TEFC direct drive 625kg / 1370lbs

Dimensions



Product Description	Order No.
622 5HR CE 18.5kW, 230/400V, 3-ph, 50Hz	9006225HR601
622 5HR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	9006225HR602
622 5VR CE 18.5kW, 230/400V, 3-ph, 50Hz	9006225VR601
622 5VR CE 18.5kW, 200-220/380V, 3-ph, 50/60Hz	9006225VR602
622 5H25, 25hp, 230/460V, 3-ph, 60Hz	9006225H25
622 5HR (Bare shaft) Horizontal flow	9006225HR
622 5VR (Bare shaft) Vertical flow	9006225VR
622 5V25, 25hp, 230/460V, 3-ph, 60Hz	9006225V25
Accessories & Spares	Order No.
Replacement 6" booster Mseal - seal kit	607552001
Replacement 6" booster - maintenance kit	607552002

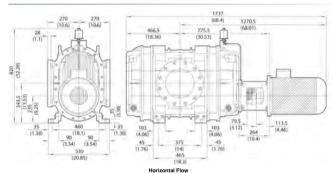
The Edwards HV8000 high vacuum mechanical booster has been developed to provide high reliability operation in aggressive environments.

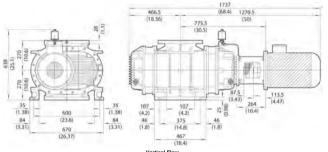
With a nominal pumping speed of 7200 m³h¹ (4241 ft³ min¹) at 50Hz, it is ideal for large industrial and chemical applications including, steel degassing, metallurgy, coating, electron beam welding and the process engineering industries.

Features & Benefits

- Derived from the successful range of HV pressure blowers, the HV8000 is designed for arduous duty cycles and high power applications.
- Ideal for larger scale, harsh industrial and chemical applications, the HV8000 is available in Industrial, ATEX or Explosion Proof configurations.
- The HV8000 may be ordered as either bareshaft or with motor fitted. Variable frequency drives may be specified for greater versatility.
- The HV8000 is available in vertical or horizontal gas flow configuration.
- For long service life, the external shaft seal is water-cooled.

Dimensions





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Page 381

Technical Data

flow config)

Displacement (swept volume) (50Hz)	7200 m ³ h ⁻¹ / 4241 ft ³ min ⁻¹
Displacement (swept volume) (60Hz)	8640 m ³ h ⁻¹ / 5089 ft ³ min ⁻¹
Max rotation speed (50Hz)	3000 rpm
Max rotation speed (60Hz)	3600 rpm
Max pressure differential (50Hz)	190 mbar / 143 Torr
Max pressure differential (60Hz)	120 mbar / 90 Torr
Ultimate (depends on backing set) (50Hz)	1.5 x 10 ⁻⁴ mbar / 1 x 10 ⁻⁴ Torr
Ultimate (depends on backing set) (60Hz)	2 x 10 ⁻⁴ mbar / 1.5 x 10 ⁻⁴ Torr
Electrical supply voltage (50Hz)	380-415V, 3-ph
Electrical supply voltage (60Hz)	440-460V, 3-ph
Standard motor power (50Hz)	15 kW / 20 hp
Standard motor power (60Hz)	18.5 kW / 25 hp
Standard backing set speed requirements	2600 m ³ h ⁻¹ / 1530 ft ³ min ⁻¹
Recommended oil	Mobile SHC 629
Max oil capacity (vertical gas flow config)	8.3 liter / 2.18 US gal

Product Description	Order No.
HV8000IND VF 380-415V, 3-ph, 50Hz, 18.5kW	A31101935
HV8000IND VF 440-460V, 3-ph, 60Hz, 25hp	A31101936
HV8000IND VF bareshaft	A31101985
HV8000IND HF 380-415V, 3-ph, 50Hz, 18.5kW	A31102935
HV8000IND HF 440-460V, 3-ph, 60Hz, 25hp	A31102936
HV8000IND HF bareshaft	A31102985
Accessories & Spares	Order No.
HV8000 VF motor mounting kit IEC	A31101002
HV8000 VF motor mounting kit NEMA	A31101006
HV8000 HF motor mounting kit IEC	A31102002
HV8000 HF motor mounting kit NEMA	A31102006
Gear Box Oil 4 Ltr Mobil SHC 629	H11023011
HV8000 Set of O-Rings spare	A31101801

*	
Inlet/outlet connection	10" class 150 ASME B16.5
Inlet/outlet cooling water connection	$Rp^{1}/_{2} ISO 7-1 (^{1}/_{2} BSP)$
End cover purge gas inlet	$Rp^{3}/_{8}$ ISO 7-1 ($^{3}/_{8}$ BSP)
Max cooling water supply pressure	4 bar / 58 psi
Max cooling water supply tem	p 35°C / 95°F
Cooling water flow rate	15 I min -1 / 3.96 US gal min -1
Noise level	82 dB(A)
Weight (without motor)	580 kg / 1279 lb

Weight (with standard motor)

720 kg / 1587 lb

HV8000 Mech seal kit spare	A31101802
HV8000 mech seal + sleeve kit spare	A31101803
HV8000 gear set spare	A31101804
HV8000 bearings kit spare	A31101805
HV8000 rotors kit spare	A31101806
HV8000 oil resevoir spare	A31101807
HV8000 sight glass spare	A31101808

HV30000 Mechanical Booster Pump

The HV pump systems combine Edwards expertise in manufacture and assembly of complete industrial vacuum systems with Dresser's world-renowned Roots pump technology. These pumps are backed by Edwards Dry Pumps or Mechanical Booster pumps.

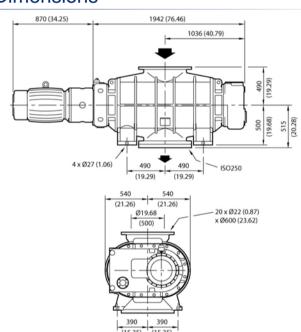
This range of high capacity mechanical booster pumps is designed to operate reliably for long periods with no need for maintenance. The HV pumps can be fitted with an inverter to allow them to be started at atmospheric pressure, at the same time as the dry pumps.



Features & Benefits

- · Water cooled shaft seals and after cooler
- Fitted with thermal snap-switch, to protect the pump from over temperature
- Nitrogen purge inlet fitted as standard
- · Vertical flow, direct drive (horizontal optional)
- · Control with inverter, or interlock with a pressure switch input

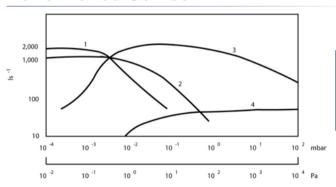
Dimensions



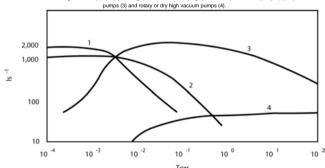
Applications

- · Semiconductor processing
- Vacuum distillation
- Vacuum packaging
- Steel degassing
- Thin film coating

Performance Curves



In their most efficient range, booster pumps (1) fill the gap between the pumping speeds of vapor diffusion pumps (2), vapor booster



In their most efficient range, booster pumps (1) fill the gap between the pumping speeds of vapor diffusion pumps (2), vapor booster pumps (3) and rotary or dry high vacuum pumps (4).

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Technical Data

Displacement

50 Hz Supply $30000 \text{ m}^3 \text{h}^{-1}$

17700 ft min -1

36000 m³h⁻¹ 60 Hz Supply

21204 ft min -1

Maximum pressure differential

50 Hz Supply 29 mbar

22 Torr

60 Hz Supply 24 mbar

18 Torr

2 x GV400 / DP400 and 2 x EH4200 Recommended backing pumps

400 V 50 Hz 3-ph or 460 V 60 Electrical supply

Hz 3-ph

30 kW / 40 hp Motor power 50 Hz

Motor power 60 Hz

Cooling-water supply

Maximum pressure 10 bar / 145 psi

Inlet temperature 20 °C

Recommended oil Ultragrade 20 Oil capacity 33 I / 34.9 qt Ambient operating temperature 5 - 40 °C Maximum operating humidity 100% RH

Weight (without motor) 3100 kg / 6820 lb

On request

Product Description	Order No.
HV30000 High Capacity Mechanical Booster Pump	HV30000 Mechanical Booster Pump

Chemical Dry Pumps







EDP Series Chemical Dry Pumps	388
CDX Dry pumps	396

9

Chemical Dry Pumps

Edwards is a market leader in dry pump technology and pioneer of dry vacuum for the chemical process, pharmaceutical and fine chemical industries. The CDX uses the very latest in screw pumping technology, whilst the EDP range utilizes the reverse claw mechanism, proven over more than 20 years and in over 100,000 installations worldwide, to provide a clean and robust vacuum solution.

Why Dry?

Dry running pumps have no oil, steam or water in the process volume. This eliminates, at source, the pollution traditionally associated with wet sealed vacuum systems and provides cost and materials handling benefits as the sealing medium does not have to be replenished:

- · no contamination of the process stream
- · no polluted effluent
- · no messy oil drums
- improved processing with reduced down time
- · lower utility and consumable costs



The proven and rugged non contacting designs, both screw and reverse claw mechanisms, include the ability to control pump body and internal gas temperatures allowing a comprehensive range of solvents, flammables and corrosives to be pumped. Systemized variants address the EU's explosive atmospheres (ATEX) directive for Category (Zone 0) T4 operation. The mechanisms are both highly tolerant to liquids and particles in the gas stream and are suitable for many applications, including:

- Distillation
- Drying
- · Evaporation and crystalisation
- · Filter/dryers
- Solvent recovery
- · Reactor service
- · House/central vacuum

The product range is available from $80 \text{ m}^3\text{h}^{-1}$ / $47 \text{ ft}^3\text{min}^{-1}$ to $1000 \text{ m}^3\text{h}^{-1}$ 590 ft $^3\text{min}^{-1}$ with capacity expandable to $30000 \text{ m}^3\text{h}^{-1}$ / $17660 \text{ ft}^3\text{min}^{-1}$ and an ultimate pressure of better than 10^{-2} mbar / 0.015 Torr using combinations of mechanical vacuum boosters. Applications Engineering is a core competence and Edwards are able to offer a comprehensive solutions package that includes:

- Process design
- Equipment specification and selection
- Safety and operating procedures
- · Vacuum system and control integration
- · Commissioning advice

Edwards have a full range of dry pumps with a set of characteristics suited to most applications.

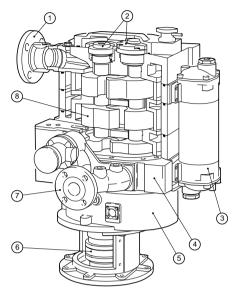
EDP Series A vertical claw pump with indirect cooling and temperature control - ideally suited to applications where there is the likelihood of liquid carry over, where cooling water is likely to be of low quality, or where close temperature control of the pump is required.

CPH Series A horizontal claw pump for applications with a low risk of significant liquid carry over, and where temperature control of the pump is not critical.

CDX A large capacity dry pump for applications where high speed pumping is required from atmosphere down to process pressures.

Chem-Dry CD Series A range of multi-stage roots pumps for

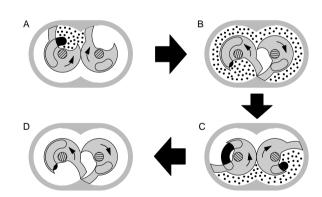
Chem-Dry CD Series A range of multi-stage roots pumps for applications where high vapor loads require to be condensed out between pump stages.



- Inlet
- Sealed high vacuum bearings
- Indirect cooling
 Rugged modular construction
- Gearbox
- Torque limiter
- Outlet

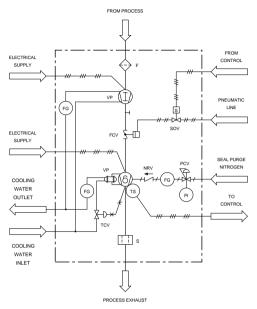
The Reverse Claw Mechanism

The EDP and CPH range are multistage claw mechanisms. Each stage comprises of two claw shaped rotors on parallel shafts, which rotate in opposite directions. The claws trap and compress the process gas, which takes a zig-zag path between the stages, as it is moved along the axis of the shaft from the inlet at the top to the exhaust at the bottom.



- Inlet exposed
- Outlet isolated Outlet isolated

During each complete rotation of the claws, first the inlet port of each pair is exposed (to admit gas to the pump), then both the inlet and outlet are isolated (to trap and compress the gas) and finally the outlet is exposed (to expel the compressed gas).



P&ID example: Typical dry pump system with mechanical booster and seal purge options

Accessory modules offered include:

Mechanical Boosters

Provide increased pumping speed & improved ultimate. Available

- · Hydrokinetic drive for faster pumpdown
- · Rotation sensors

Gas Purges

Used to dilute flammables and improve seal life

- Inlet purge*
- Shaft seal purge*

Safety

Edwards offer a comprehensive range of solutions to containment and constructional safety, to satisfy ATEX or your own requirements.

- Flame arrestors
- Solvent flush*
- Inlet isolation valves*

Vessels

Solvents and other liquids carried over in the process stream can be recovered upstream or downstream of the pump.

- Knock-out pot*
- · Condenser
- Receiver*

Acoustics

Silencers reduce pulsations in the exhaust and hence noise in the exhaust line. All silencers are drainable.

Silencers

Monitoring & Control

Offerings range from gauges and simple 4-20 mA transmitters to fully enclosed bespoke control units.

- · Temperature transmitters
- Pressure transmitters
- Pressure gauges
- Rotation sensors
- Inverter drives
- Control box
- Denotes item is available with solenoid/switch control/actuation.
- All additional control and sensor requirements to achieve zoning are supplied with the flame arrestor module

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EDP80 - Dry Chemical Pumps

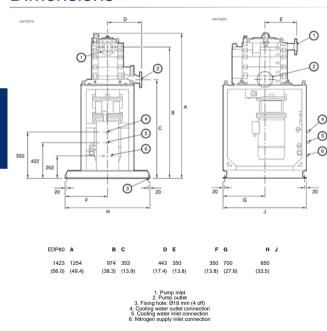


EDP pumps are based on Edwards' oil-free, non-contacting, award-winning, reverse claw mechanism. They provide consistent vacuum at high efficiencies and low costs of ownership. Dry pumps completely eliminate all problems of process contamination and creation of polluted effluent, which are experienced with traditional wet vacuum pump technologies.

Features & Benefits

- Staged compression for optimum temperature profile within the pump and no requirement for cooling gas injection
- · Inherently free draining
- Able to handle liquid or particulate carryover
- Short gas path eliminates particulate build-up and corrosion -Edwards' patented design
- Can flush with solvents, water or steam

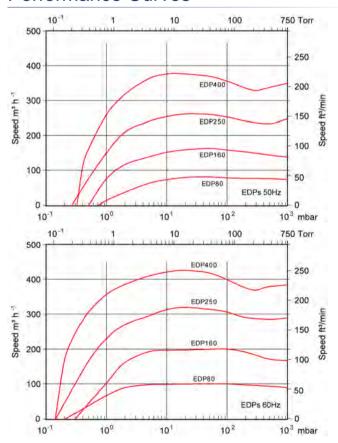
Dimensions



Applications

- Drying
- Distillation
- Reactor service
- Solvent recovery
- House/Central vacuum

Performance Curves



9

9

Technical Data

Maximum pumping speed	
50 Hz	83 m h ⁻¹ / 49 ft min ⁻¹
60 Hz	$102 \mathrm{m}^3 \mathrm{h}^{-1} / 60 \mathrm{ft}^3 \mathrm{min}^{-1}$
Capacity at 10 mbar (7.5 Torr)	
50 Hz	75 m ³ h ⁻¹ / 44 ft min -1
60 Hz	$102 \mathrm{m}^3 \mathrm{h}^{-1} / 60 \mathrm{ft}^3 \mathrm{min}^{-1}$
Ultimate vacuum	
50 Hz	0.5 mbar / 0.4 Torr
60 Hz	0.3 mbar / 0.2 Torr
Maximum back pressure	
Standard	1150 mbar / 2.2 psig
Optional*	1300 mbar / 4.4 psig
Power consumption at 10 mbar (7.5 Torr)	
50 Hz	3.3 kW / 4.4 hp
60 Hz	4.0 kW / 5.4 hp
Standard motor (380 – 400 V, 3 ph, 50 Hz)	5.5 kW
Standard motor (200 – 460 V, 3 ph, 60 Hz)	7.5 hp
Cooling water flow rate (adjustable)	
50 Hz	$1 - 8 \text{I min}^{-1} / 0.3 - 2.1 \text{gal min}^{-1}$
60 Hz	1 – 10 l min ⁻¹ /0.3 – 2.6 gal min
Cooling water supply pressure	2 – 10 barg / 29 – 145 psig
Seal purge flow (maximum), regulated to 0.3 - 0.5 barg (5 – 7 psig)	20 I min ⁻¹ / 0.7 ft min ⁻¹
Seal purge supply pressure(minimum - maximum)	2 – 10 barg / 29 – 145 psig
Noise (max. with exhaust silencer)	73 dB(A)
Weight (with frame and standard motor)	
50 Hz	648 kg / 1429 lbs
60 Hz	650 kg / 1433 lbs
Inlet	2" ANSI / DN50
Outlet	1.5" ANSI / DN40
Pumping mechanism	3 stage reversed claw

^{*} Consult Edwards

Product Description	Order No.
EDP80 50Hz, Bareshaft Pump	A70545000
EDP80 60Hz, Bareshaft Pump	A70547000
Accessories & Spares	Order No.
Spares Kit Routine Maintenance DP	A70501825
Spares Kit Motor Fitment DP	A70501805
Spares Kit Upper Bearing DP	A70501826
Spares Kit Swept Volume DP	A70501827
Spares Kit Lower Bearing DP	A70501828
Std Replacement PRV DP	A70501816
Bellows Replacement PRV DP	A70501820
Swing PRV Chemical	A70501832
Spares Kit Bellows Overhaul DP	A70501829
Spares Kit O Ring DP	A70501821
Spares Kit Std PRV Overhaul DP	A70501831
Spares Kit Swing PRV Overhaul Chemical	A70501833
DP250/EDP200 Clutch Tools	A21071082

EDP160 - Dry Chemical Pumps

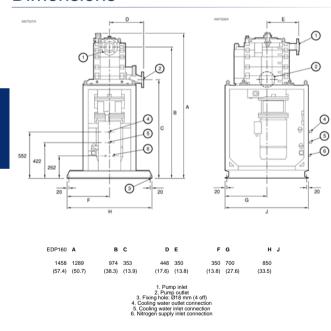


EDP pumps are based on Edwards' oil-free, non-contacting, award-winning, reverse claw mechanism. They provide consistent vacuum at high efficiencies and low costs of ownership. Dry pumps completely eliminate all problems of process contamination and creation of polluted effluent, which are experienced with traditional wet vacuum pump technologies.

Features & Benefits

- Staged compression for optimum temperature profile within the pump and no requirement for cooling gas injection
- · Inherently free draining
- · Able to handle liquid or particulate carryover
- Short gas path eliminates particulate build-up and corrosion -Edwards' patented design
- Can flush with solvents, water or steam

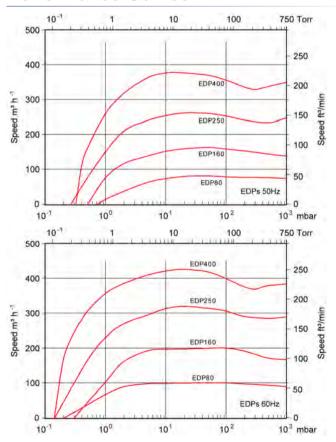
Dimensions



Applications

- Drying
- Distillation
- Reactor service
- Solvent recovery
- House/Central vacuum

Performance Curves



9

Technical Data

Maximum pumping speed	
50 Hz	163 m ³ h ⁻¹ / 96 ft min ⁻¹
60 Hz	202 m h ⁻¹ / 119 ft min ⁻¹
Capacity at 10 mbar (7.5 Torr)	
50 Hz	$153 \text{m}^3 \text{h}^{-1} / 90 \text{ft}^3 \text{min}^{-1}$
60 Hz	198 m ³ h ⁻¹ / 117 ft ³ min ⁻¹
Ultimate vacuum	
50 Hz	0.5 mbar / 0.4 Torr
60 Hz	0.3 mbar / 0.2 Torr
Maximum back pressure	
Standard	1150 mbar / 2.2 psig
Optional*	1300 mbar / 4.4 psig
Power consumption at 10 mbar (7.5 Torr)	
50 Hz	4.9 kW / 6.6 hp
60 Hz	4.9 kW / 6.6 hp
Standard motor (380 $-$ 400 V, 3 ph, 50 Hz)	7.5 kW
Standard motor ($200 - 460 \text{ V}$, 3 ph, 60 Hz)	11 hp
Cooling water flow rate (adjustable)	
50 Hz	$1 - 8 \text{I min}^{-1} / 0.3 - 2.1 \text{gal min}^{-1}$
60 Hz	1 – 10 l min ⁻¹ /0.3 – 2.6 gal min
Cooling water supply pressure	2 – 10 barg / 29 – 145 psig
Seal purge flow (maximum),regulated to 0.3 - 0.5 barg (5 – 7 psig)	20 I min ⁻¹ / 0.7 ft min ⁻¹
Seal purge supply pressure(minimum - maximum)	2 – 10 barg / 29 – 145 psig
Noise (max. with exhaust silencer)	78 dB(A)
Weight (with frame and standard motor)	
50 Hz	747 kg / 1647 lbs
60 Hz	756 kg / 1667 lbs
Inlet	3" ANSI / DN80
Outlet	1.5" ANSI / DN40
Pumping mechanism	3 stage reversed claw

* Consult Edwards

Product Description	Order No.
EDP160 50Hz, Bareshaft Pump	A70544000
EDP160 60Hz, Bareshaft Pump	A70546000
Accessories & Spares	Order No.
Spares Kit Routine Maintenance DP	A70501825
Spares Kit Motor Fitment DP	A70501805
Spares Kit Upper Bearing DP	A70501826
Spares Kit Swept Volume DP	A70501827
Spares Kit Lower Bearing DP	A70501828
Std Replacement PRV DP	A70501816
Bellows Replacement PRV DP	A70501820
Swing PRV Chemical	A70501832
Spares Kit Bellows Overhaul DP	A70501829
Spares Kit O Ring DP	A70501821
Spares Kit Std PRV Overhaul DP	A70501831
Spares Kit Swing PRV Overhaul Chemical	A70501833
DP250/EDP200 Clutch Tools	A21071082

EDP250 - Dry Chemical Pumps

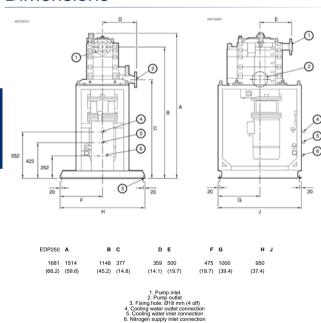


EDP pumps are based on Edwards' oil-free, non-contacting, award-winning, reverse claw mechanism. They provide consistent vacuum at high efficiencies and low costs of ownership. Dry pumps completely eliminate all problems of process contamination and creation of polluted effluent, which are experienced with traditional wet vacuum pump technologies.

Features & Benefits

- Staged compression for optimum temperature profile within the pump and no requirement for cooling gas injection
- · Inherently free draining
- Able to handle liquid or particulate carryover
- Short gas path eliminates particulate build-up and corrosion -Edwards' patented design
- Can flush with solvents, water or steam

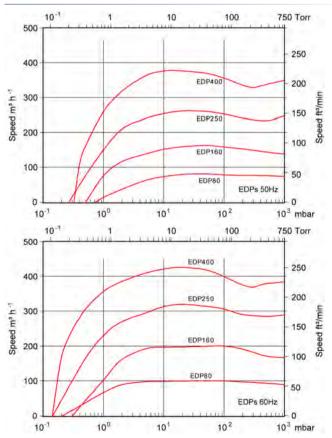
Dimensions



Applications

- Drying
- Distillation
- Reactor service
- Solvent recovery
- House/Central vacuum

Performance Curves



Technical Data

Maximum pumping speed	
50 Hz	260 m ³ h ⁻¹ / 320 ft min ⁻¹
60 Hz	153 m h - 1 / 188 ft min - 1
Capacity at 10 mbar (7.5 Torr)	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
50 Hz	255 m ³ h ⁻¹ / 150 ft ³ min ⁻¹
50 Hz	315 m ³ h ⁻¹ / 185 ft min ⁻¹
Ultimate vacuum	010 III II 7 100 It IIIII
50 Hz	0.5 mbar / 0.4 Torr
60 Hz	0.2 mbar / 0.2 Torr
Maximum back pressure	
Standard	1150 mbar / 2.2 psig
Optional*	1300 mbar / 4.4 psig
Power consumption at 10 mbar (7.5 Torr)	
50 Hz	6.0 kW / 8.0 hp
60 Hz	6.0 kW / 8.0 hp
Standard motor (380 $-$ 400 V, 3 ph, 50 Hz)	
50 Hz	11 kW
60 Hz	15 kW
Standard motor (200 – 460 V, 3 ph, 60 Hz)	
50 Hz	15 hp
60 Hz	20 hp
Cooling water flow rate (adjustable)	
50 Hz	$1 - 10 \text{ l min}^{-1} / 0.3 - 2.6 \text{ gal min}^{-1}$
60 Hz	$1 - 10 \text{ I min}^{-1} / 0.3 - 2.6 \text{ gal min}^{-1}$
Cooling water supply pressure	2 – 10 barg / 29 – 145 psig
Seal purge flow (maximum),regulated to 0.3 - 0.5 barg (5 – 7 psig)	20 l min ⁻¹ / 0.7 ft ³ min ⁻¹
Seal purge supply pressure(minimum - maximum)	2 - 10 barg / 29 - 145 psig
Noise (max. with exhaust silencer)	
50 Hz	78 dB(A)
60 Hz	79 dB(A)
Weight (with frame and standard motor)	
50 Hz	756 kg / 1667 lbs
60 Hz	848 kg / 1870 lbs
Inlet	3" ANSI / DN80
Outlet	1.5" ANSI / DN40
Pumping mechanism	3 stage reversed claw

Ordering Information

Product Description	Order No.
EDP250 50/60Hz, Bareshaft Pump	A70543000
Accessories & Spares	Order No.
Spares Kit Routine Maintenance DP	A70501825
Spares Kit Motor Fitment DP	A70501805
Spares Kit Upper Bearing DP	A70501826
Spares Kit Swept Volume DP	A70501827
Spares Kit Lower Bearing DP	A70501828
Std Replacement PRV DP	A70501816
Bellows Replacement PRV DP	A70501820
Swing PRV Chemical	A70501832
Spares Kit Bellows Overhaul DP	A70501829
Spares Kit O Ring DP	A70501821
Spares Kit Std PRV Overhaul DP	A70501831
Spares Kit Swing PRV Overhaul Chemical	A70501833
DP250/EDP200 Clutch Tools	A21071082

EDP400 - Dry Chemical Pumps

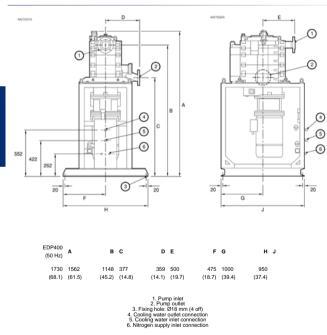


EDP pumps are based on Edwards' oil-free, non-contacting, award-winning, reverse claw mechanism. They provide consistent vacuum at high efficiencies and low costs of ownership. Dry pumps completely eliminate all problems of process contamination and creation of polluted effluent, which are experienced with traditional wet vacuum pump technologies.

Features & Benefits

- Staged compression for optimum temperature profile within the pump and no requirement for cooling gas injection
- Inherently free draining
- · Able to handle liquid or particulate carryover
- Short gas path eliminates particulate build-up and corrosion -Edwards' patented design
- Can flush with solvents, water or steam

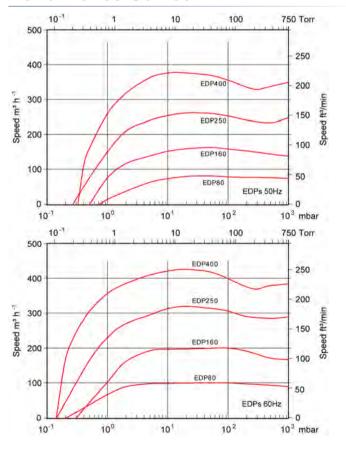
Dimensions



Applications

- Drying
- Distillation
- Reactor service
- Solvent recovery
- House/Central vacuum

Performance Curves



Technical Data

Maximum pumping speed	
50 Hz	377 m ³ h ⁻¹ / 222 ft ³ min ⁻¹
60 Hz	427 m ³ h ⁻¹ / 251 ft ³ min ⁻¹
Capacity at 10 mbar (7.5 Torr)	
50 Hz	$377 \mathrm{m}^3 \mathrm{h}^{-1} / 222 \mathrm{ft}^3 \mathrm{min}^{-1}$
50 Hz	422 m ³ h ⁻¹ / 248 ft ³ min ⁻¹
Ultimate vacuum	
50 Hz	0.4 mbar / 0.3 Torr
60 Hz	0.2 mbar / 0.2 Torr
Maximum back pressure	
Standard	1150 mbar / 2.2 psig
Power consumption at 10 mbar (7.5 Torr)	
50 Hz	7.0 kW / 9.4 hp
60 Hz	7.0 kW / 9.4 hp
Standard motor (380 – 400 V, 3 ph, 50 Hz)	
50 Hz	18.5 kW
60 Hz	25.0 kW
Standard motor (200 – 460 V, 3 ph, 60 Hz)	
50 Hz	25.0 hp
60 Hz	30.0 hp
Cooling water flow rate (adjustable)	
50 Hz	1 – 10 l min ⁻¹ /0.3 – 2.6 gal min ⁻¹
60 Hz	1 – 10 l min ⁻¹ /0.3 – 2.7 gal min
Cooling water supply pressure	2 – 10 barg / 29 – 145 psig
Seal purge flow (maximum),regulated to 0.3 - 0.5 barg (5 – 7 psig)	20 I min ⁻¹ / 0.7 ft ³ min ⁻¹
Seal purge supply pressure(minimum - maximum)	2 - 10 barg / 29 - 145 psig
Noise (max. with exhaust silencer)	
50 Hz	82 dB(A)
60 Hz	82 dB(A)
Weight (with frame and standard motor)	
50 Hz	918 kg / 2024 lbs
60 Hz	960 kg / 2116 lbs
Inlet	3" ANSI / DN80
Outlet	1.5" ANSI / DN40
Pumping mechanism	3 stage reversed claw

^{*} Consult Edwards

Product Description	Order No.
EDP400 50 Hz, Bareshaft Pump	A70542000
EDP400 60 Hz, Bareshaft Pump	A70541000
Accessories & Spares	Order No.
Spares Kit Routine Maintenance DP	A70501825
Spares Kit Motor Fitment DP	A70501805
Spares Kit Upper Bearing DP	A70501826
Spares Kit Swept Volume DP	A70501827
Spares Kit Lower Bearing DP	A70501828
Std Replacement PRV DP	A70501816
Bellows Replacement PRV DP	A70501820
Swing PRV Chemical	A70501832
Spares Kit Bellows Overhaul DP	A70501829
Spares Kit O Ring DP	A70501821
Spares Kit Std PRV Overhaul DP	A70501831
Spares Kit Swing PRV Overhaul Chemical	A70501833
DP250/EDP200 Clutch Tools	A21071082

CDX1000 Dry Vacuum Pump



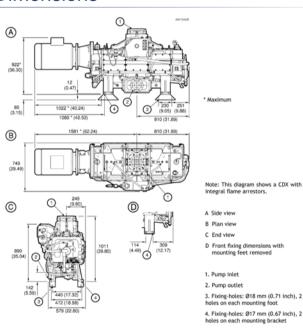
Edwards CDX1000 represents the next generation of dry pump technology. The CDX1000 is a double ended mechanism for the chemical process, pharmaceutical and petrochemical industries.

This innovative technology leverages Edwards latest manufacturing and design philosophies. The CDX1000 is suited to larger processes where repeatability and reliability are key. Technologies and manufacturing techniques have been carefully selected to produce a robust, high performance machine that is simple to operate and maintain.

Features & Benefits

- Continuous performance from atmospheric pressures to ultimate vacuum
- Excellent temperature control
- Large liquid slug capabilities
- No effluent generated
- Dry running mechanism

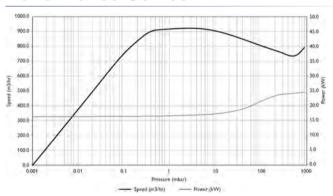
Dimensions



Applications

- Processes
- Distillation
- Drying
- Evaporation/Crystallisation
- Solvent/Vapour Recovery

Performance Curves



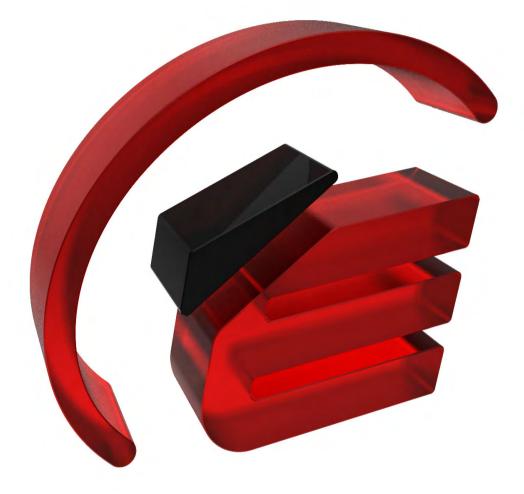
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Technical Data

. Commodi Data	
Maximum pumping speed	900 m ³ h ⁻¹
	530 ft min -1
Capacity at 10 mbar (7.5 Torr)	900 m ³ h ⁻¹
	530 ft min -1
Ultimate vacuum	0.005 mbar
	0.004 Torr
Maximum back pressure - standard (optional*)	1150 mbarA
	2.0 Psig
Power consumption at10 mbar (7.5 Torr)	17.1 kW
	23.2 Hp
Standard motor(380 - 400V, 3 ph, 50 Hz)	30 kW
Standard motor(200 - 460V, 3 ph, 60 Hz)	40 hp
Cooling water flow rate (adjustable)	10 – 20 l min ⁻¹
	2.64 - 5.28 gal min -1
Cooling water supply temperature range	5 - 35 °C / 41 - 95 °F
Cooling water supply pressure	2 – 10 barg
	29 – 145 Psig
Seal purge flow (maximum), regulated to 0.3 - 0.5 barg, (5 - 7 psig)	24 l min ⁻¹
	0.85 ft min -1
Seal purge supply pressure(minimum - maximum)	2 – 10 barg
	29 – 145 Psig
Noise (max. with exhaust silencer)	82 dB(A)
Weight (with frame and standard motor)	1710 kg
	3765 Lbs
Process connection, inlet	6" ANSI/DN150
Process connection, outlet	3" ANSI/DN80
Pumping mechanism	
-	

^{*} Consult Edwards

Product Description	Order No.
CDX1000, 30kW, 50 Hz, Flame Proof with Integral Flame Arrestors	A70801985
CDX1000 Dry Vacuum Pump, 30kW, 50 Hz, Flame Proof (without Integral Flame Arrestors)	A70802985
CDX1000 Dry Vacuum Pump, 40 HP, 60 Hz, Flame Proof with Integral Flame Arrestors	A70811985
CDX1000 Dry Vacuum Pump, 40 HP, 60 Hz, Flame Proof (without Integral Flame Arrestors)	A70812985
Accessories & Spares	Order No.
Gear Box Oil 4 Ltr Mobil SHC 629	H11023011
Coolant 0.9/2L Drystar	H12810003
IDX Routine maintenance kit	A70801800
IDX Heat exchanger cleaning kit	A70801801
IDX Cooling system overhaul kit	A70801802
IDX Motor fitting kit	A70801803
IDX Drive coupling kit	A70801804
IDX Bearing and seal replacement kit	A70801805
IDX Oil pump replacement kit	A70801806
IDX Strip and rebuild kit	A70801807
IDX Flame arrestor cleaning kit	A70801808
IDX Hoses kit	A70801809
IDX Flame arrestor replacement kit (inlet)	A70801810
IDX Flame arrestor replacement kit (outlet)	A70801811
IDX Flame arrestor tooling kit	A70801812



Liquid Ring Pumps







HR Series Liquid Ring Pumps	403
LR Single Stage Liquid Ring Pumps	411
LR Series Two Stage Liquid Ring Pumps	433
LR1A Liquid Ring Pumps	463
LR1B Liquid Ring Pumps	485

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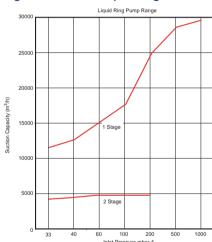
Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

Operating Range

Liquid ring pumps are suitable for continuous operation on vacuum applications at any suction pressure down to 30 mbar A. Standard performance data is based upon 15 °C water as the seal liquid, lower pressures may be possible with alternative sealing liquid.

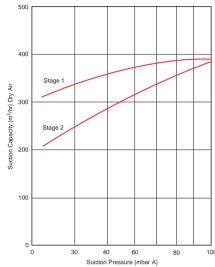
A wide range of capacities are offered from two basic pump configurations, single and two stages.

Liquid Ring Vacuum Pump Range



The single stage range is capable of operation at 30 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A. The smallest pump in the range is a 25 m³h⁻¹ close coupled model while the largest has a nominal capacity of 30000 m³h⁻¹.

The two-stage range is most effective on applications with continuous operation below 100 mbar A and has models from 50 up to 5000 m³h⁻¹. Detailed performance data is shown on the following pages.



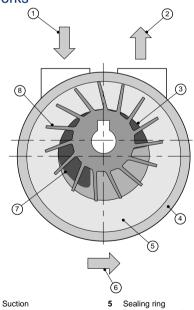
Comparison of Single and two stage performance

Materials of Construction

The standard construction material is cast iron with either a spheroidal graphite or bronze impeller depending upon the series. One of the main features of the liquid ring pump is the availability of various alternative materials of construction. The main options are stainless steel, aluminum bronze, and duplex stainless steels. Some pump sizes, which are particularly suited to the pharmaceutical industry, are also available in hastelloy.

For details on material availability please contact your local sales office.

How It Works



Discharge

of compression from the pump.

- Discharge port
- Direction of rotation
- The impeller is mounted eccentrically to the axis of the pump casing,
- the liquid ring circulates concentrically within the axis of the casing. Process gases are drawn through the inlet port into the impeller cells where the gas is compressed and discharged through the discharge port. The seal liquid which forms the liquid ring is supplied at a pressure equal to the discharge pressure of the pump, which allows the pump to automatically make up the amount of liquid which is discharged through the discharge port, therefore removing the heat

Applications

Some of the more common processes which utilize liquid ring technology are listed below.

- Distillation
- Filtration
- Evaporation

- Stripping
- Solvent recovery
- Deaeration

Drying

These processes are used in a wide range of industries and applications, which include:

- · Chemical processing
- · Food processing and packaging · Automobile components
- Pharmaceutical production Oil exploration and refining
- Glass industry
- Tobacco conditioning
- Packaging
- Electronics industry
- Power generation
- Waste collection
- **Building materials**
- Soil remediation

Systems

Liquid ring pumps are offered in a number of standard configurations, with a selection of seal liquid systems to suit the particular application and environment.

SLRP Configurator

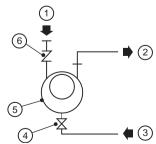
The SLRP system utilizes 3D AutoCAD design software to produce a tailored liquid ring pump package constructed from pre-engineered modules. The main benefits being the instant availability of a customized quotation and package general arrangement drawing and reduced lead times.

The system offers a selection of pump material options along with a choice from three standard operating configurations to suit the process conditions.



Once-Through

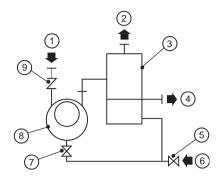
This is the most basic configuration available, it comprises of a pump complete with electric motor and drive and base frame. A discharge separator is required at the pump discharge. It is used where an ample supply of seal liquid, which can be subsequently discharged to drain, is available. The liquid/gas mixture is discharged to drain through the discharge line.



- Process gas inlet
- Fluid gas mixture to drain
- Regulating valve
- Edwards liquid ring vacuum pump

Partial Recirculation

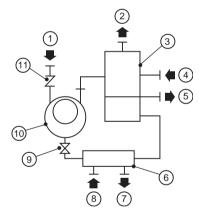
In this case, the liquid/gas mixture is separated in the discharge separator. The recovered service liquid is then mixed with fresh seal fluid to maintain a constant temperature to the pump. The excess liquid, equivalent to the make-up supply, goes to drain. The minimum amount of fresh make-up fluid is used to ensure cavitation free operation at the required suction pressure.



- Process gas inlet
- Gas vent
- Discharge separator
- - Seal fluid make-up valve
- Make-up fluid
- Manual control valve Edwards liquid ring vacuum pump
- Check valve

Total Recirculation

Total recirculation is used where it is desirable to minimize waste liquid from the pump. All of the liquid is re-circulated back into the pump via a heat exchanger, which removes the heat of compression and any latent heat of condensation from the seal liquid. The seal liquid can then be reused by the pump minimizing the effluent from the pump system. The system is of particular interest when the pump is operating on a solvent removal or drying process where process vapors are condensed within the pump, often the pump seal liquid can be the same as the condensed process vapors.



- Process gas inlet
- Gas vent
- Discharge separator Make-up fluid
- Heat exchange
- Fluid overflow to drain
- Cooling liquid out Cooling liquid in
- Manual control valve
- Edwards liquid ring vacuum pump

Standard Accessories

A range of accessories to complement the standard package are available, these can be selected in the configurator:

- · Inlet non-return valve
- Inlet isolating valve
- Inlet vacuum gauge
- Vacuum relief valve
- · Automatic seal water make up kit

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The SLRP package is available for the following pump sizes:

50 Hz

	RPM	kW	m ³ h ⁻¹	Inlet mm
SIZE 1				
LR1L90	1450	2.2	69	40
LR1L125	1450	3	111	40
LR1L150	1450	4	142	40
LR2S100	1450	3	91	40
LR2S150	1450	4	128	40
LR2S200	1450	5.5	170	40
SIZE 2				
LR1L250	1450	5.5	69	65
LR1L320	1450	7.5	111	65
LR1L450	1450	11	142	65
LR2S275	1450	7.5	244	50
LR2S350	1450	11	340	50
LR2S425	1450	15	368	50
SIZE 3				
LR1S600	1450	15	540	100
LR1S800	1450	22	790	100
LR2S600	1450	18.5	596	80
LR2S750	1450	30	640	80

60 Hz

00 HZ				
	RPM	HP	ft ³ min ⁻¹	Inlet inch
SIZE 1				
LR1L90	1750	5	59	1.5
LR1L125	1750	7.5	70	1.5
LR1L150	1750	7.5	94	1.5
LR2S100	1750	7.5	59	1.5
LR2S150	1750	10	88	1.5
LR2S200	1750	10	118	1.5
SIZE 2				
LR1L250	1750	10	129	2.5
LR1L320	1750	15	194	2.5
LR1L450	1750	20	258	2.5
LR2S275	1750	15	162	2.0
LR2S350	1750	20	235	2.0
LR2S425	1750	25	265	2.0
SIZE 3				
LR1S600	1750	30	367	4
LR1S800	1750	40	529	4
LR2S600	1750	40	383	3
LR2S750	1750	50	640	3
·	·		·	·

Hazardous Areas

The SLRP packages and accessories are available certified for hazardous area operation:

- European ATEX Ex II 2Gc, IIB T3
- USA Explosion proof Class 1 Division 1 Group C & D
- Packages suitable for operation in other zones such as ATEX Cat 1 are available on request.

Non Standard Packages

More complex systems include special recirculation systems such as the Recovac package (see later) or combinations of liquid ring pumps with roots type mechanical boosters or air, gas or steam ejectors. These hybrid systems can extend the liquid ring pump based performance envelope significantly.

Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

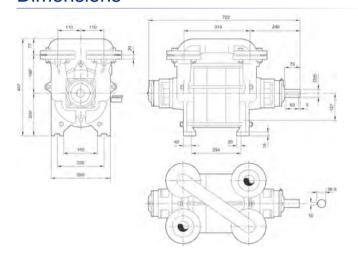


This model is the EHR2190 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- Operates across entire vacuum range
- Mechanical shaft seals
- Choice of construction materials
- Rugged, robust construction

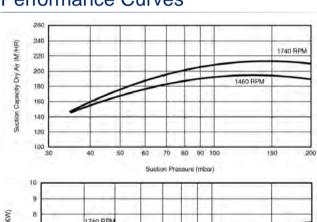
Dimensions

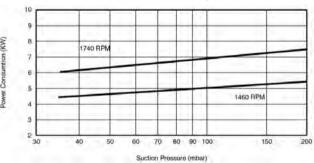


Applications

The EHR2190 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power

Performance Curves





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Page

Technical Data

Seals

	50 Hz	60 Hz
Nominal capacity	190 m ³ /h	215 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	1470 rpm	1740 rpm
Motor power	5.5 kW	7.5 kW
Weight	90 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	

Mechanical

Product Description	Order No.
EHR2190 Cast Iron	A80000000
EHR2190 Stainless Steel	A80001000
EHR2190 Stainless Steel Fitted	A80005000



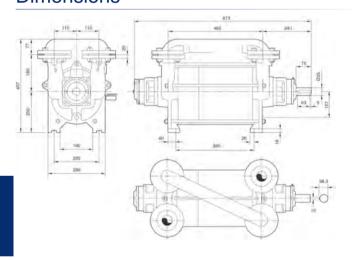
Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

This model is the EHR2390 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- · Operates across entire vacuum range
- Mechanical shaft seals
- · Choice of construction materials
- Rugged, robust construction

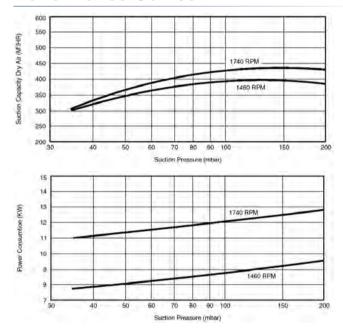
Dimensions



Applications

The EHR2390 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves



Technical Data

Shaft

Seals

	50 Hz	60 Hz
Nominal capacity	390 m ³ /h	440 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	1470 rpm	1740 rpm
Motor power	11 kW	15 kW
Weight	160 kg	
Materials of construction		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	

420S37

Mechanical

Ordering Information

Product Description	Order No.
EHR2390 Cast Iron	A80020000
EHR2390 Stainless Steel	A80021000
EHR2390 Stainless Steel Fitted	A80025000

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Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

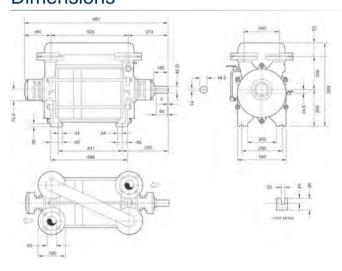


This model is the SHR2400 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- Operates across entire vacuum range
- Mechanical shaft seals
- Choice of construction materials
- Rugged, robust construction

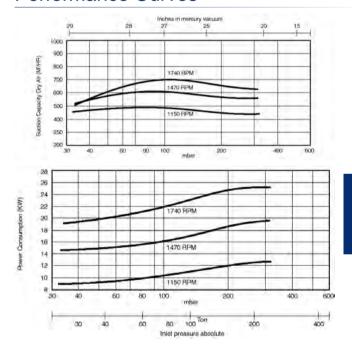
Dimensions



Applications

The SHR2400 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves



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Technical Data

	50 Hz	60 Hz
Nominal capacity	610 m ³ /h	700 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	1470 rpm	1740 rpm
Motor power	22 kW	30 kW
Weight	222 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	
Seals	Mechanical	

Product Description	Order No.
SHR2400 Cast Iron	A80060000
SHR2400 Stainless Steel	A80061000
SHR2400 Stainless Steel Fitted	A80065000



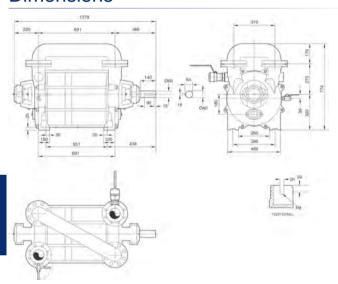
Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

This model is the SHR2400 Stainless Steel Fitted material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- · Operates across entire vacuum range
- Mechanical shaft seals
- Choice of construction materials
- Rugged, robust construction

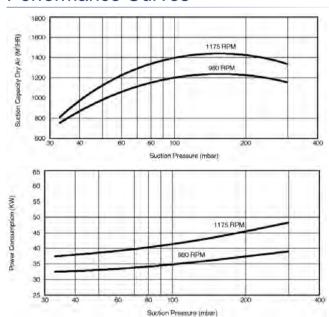
Dimensions



Applications

The SHR2750 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves



Technical Data

Seals

	50 Hz	60 Hz
Nominal capacity	1230 m ³ /h	1440 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	980 rpm	1175 rpm
Nominal motor power	45 kW	55 kW
Weight	584 kg	
Materials of construction		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	

Mechanical

Product Description	Order No.
SHR2750 Cast Iron	A80090000
SHR2750 Stainless Steel	A80091000
SHR2750 Stainless Steel Fitted	A80095000

Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

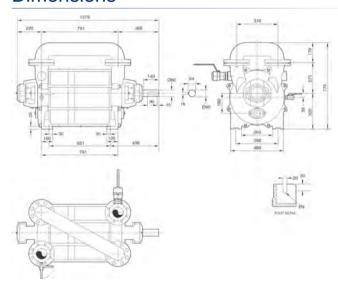


This model is the SHR2950 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- · Operates across entire vacuum range
- Mechanical shaft seals
- Choice of construction materials
- Rugged, robust construction

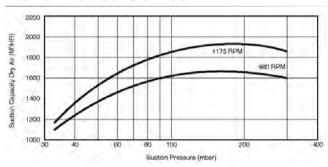
Dimensions

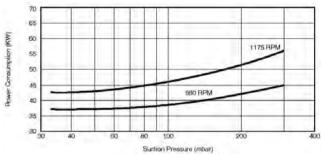


Applications

The SHR2950 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves





10

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Technical Data

Seals

	50 Hz	60 Hz
Nominal capacity	1680 m ³ /h	1920 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	980 rpm	1175 rpm
Motor power	55 kW	75 kW
Weight	760 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	

Mechanical

Product Description	Order No.
1 Toduct Description	Order No.
SHR2950 Cast Iron	A80100000
SHR2950 Stainless Steel	A80101000
SHR2950 Stainless Steel Fitted	A80105000



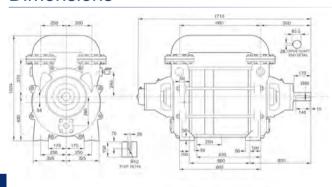
Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

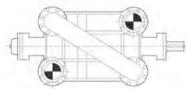
This model is the SHR21200 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- Operates across entire vacuum range
- Mechanical shaft seals
- · Choice of construction materials
- Rugged, robust construction

Dimensions

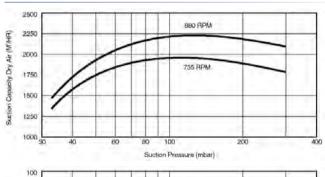


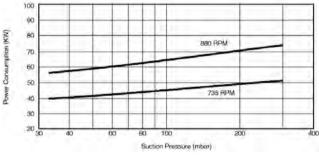


Applications

The SHR21200 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves





Technical Data

	50 Hz	60 Hz
Nominal capacity	1960 m ³ /h	2240 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	735 rpm	880 rpm
Motor power	75 kW	90 kW
Weight	1180 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	
Seals	Mechanical	

Product Description	Order No.
SHR21200 Cast Iron	A80130000
SHR21200 Stainless Steel Fitted	A80135000

Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

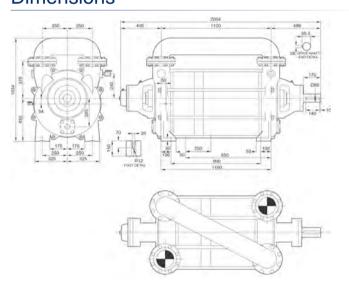


This model is the SHR21850 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- · Operates across entire vacuum range
- Mechanical shaft seals
- Choice of construction materials
- Rugged, robust construction

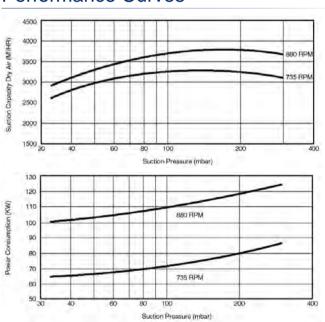
Dimensions



Applications

The SHR21850 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves



10

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Technical Data

	50 Hz	60 Hz
Nominal capacity	3280 m ³ /h	3800 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	735 rpm	880 rpm
Motor power	110 kW	132 kW
Weight	1680 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	
Seals	Mechanical	

Product Description	Order No.
SHR21850 Cast Iron	A80150000
SHR21850 Stainless Steel	A80151000
SHR21850 Stainless Steel Fitted	A80155000



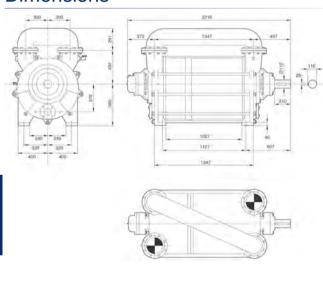
Pumps can be supplied as bareshaft or as part of a package complete with drive motor, discharge separator, heat exchanger and other accessories for recirculation of the seal liquid. In addition, all Edwards liquid ring pumps are available as part of ATEX category 1 or category 2 pump systems.

This model is the SHR22500 Cast Iron material variant.

Features & Benefits

- Two stage design peak efficiency at high vacuum
- Operates across entire vacuum range
- Mechanical shaft seals
- · Choice of construction materials
- Rugged, robust construction

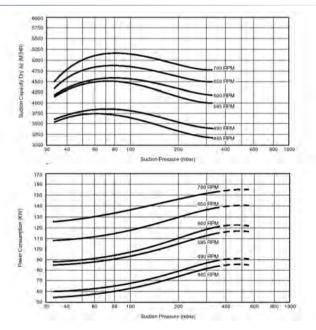
Dimensions



Applications

The SHR22500 is ideal for vacuum distillation and evaporator applications in the chemical, pharmaceutical and biofuels industry, and is also suited to condenser air extraction in the power industry.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity	4510 m ³ /h	4900 m ³ /h
Suction pressure	30 mbara	30 mbara
Nominal speed	585 rpm	650 rpm
Motor power	132 kW	150 kW
Weight	2635 kg	
Pump materials		
Casing	Cast Iron	
Body	Cast Iron	
Impeller	SG Iron	
Shaft	420S37	
Seals	Mechanical	

Product Description	Order No.
SHR22500 Cast Iron	A80170000
SHR22500 Stainless Steel	A80171000
SHR22500 Stainless Steel Fitted	A80175000

LR1M25 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

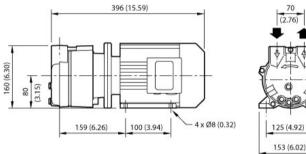
The LR1M25 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



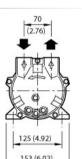
Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

Dimensions



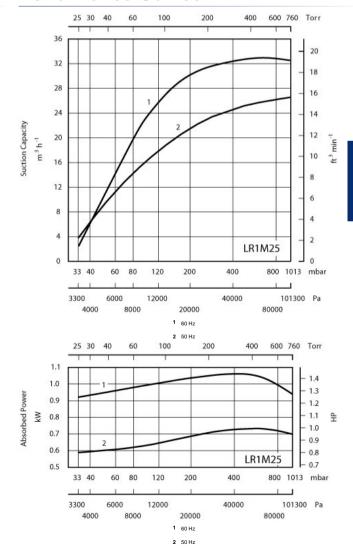
Suction/Discharge size = 1" BSP



Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	25 m h -1	33 m h -1
Nominal speed	2850 rpm	3450 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	0.75 kW	1.1 kW
Service water flow	0.2 m h -1	0.2 m ³ h ⁻¹
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	CF8M
Body	CF8M	Nitrided cast iron
Shaft	Motor	Motor
Seal	Carbon / ceramic / viton	Carbon / ceramic / viton

Product Description	Order No.
LR1M25 DIN Stainless Steel	A75002935
LR1M25 ANSI Stainless Steel	A75002936
LR1M25 DIN Stainless Steel Fitted	A75003935
LR1M25 ANSI Stainless Steel Fitted	A75003936
LR1M25 ANSI/NEMA Stainless Steel	A75008936
LR1M25 ANSI/NEMA Stainless Steel Fitted	A75009936
LR1L25 DIN Stainless Steel Fitted	A75006985
LR1L25 ANSI Stainless Steel Fitted	A75006986
LR1L25 DIN Stainless Steel	A75005985
LR1L25 ANSI Stainless Steel	A75005986

LR1M50 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

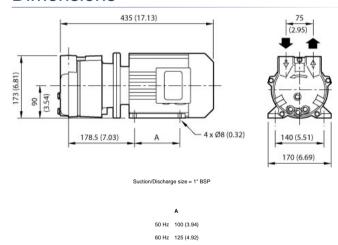
The LR1M50 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

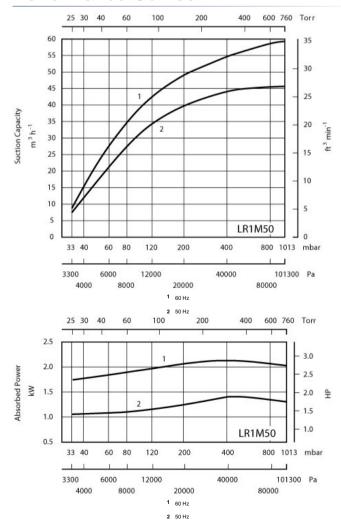
Dimensions



Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50Hz	60Hz
Nominal capacity	45 m h -1	55 m h -1
Nominal speed	2850 rpm	3450 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	1.5 kW	2.2 kW
Service water flow	0.5 m ³ h ⁻¹	0.5 m ³ h ⁻¹
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Nitrided cast iron
Body	CF8M	Nitrided cast iron
Shaft	Motor	Motor
Seal	Carbon / ceramic / viton	Carbon / ceramic / viton

Product Description	Order No.
LR1M50 DIN Stainless Steel	A75011935
LR1M50 ANSI Stainless Steel	A75011936
LR1M50 DIN Stainless Steel Fitted	A75012935
LR1M50 ANSI Stainless Steel Fitted	A75012936
LR1M50 ANSI/NEMA Stainless Steel	A75017936
LR1M50 ANSI/NEMA Stainless Steel Fitted	A75018936
LR1L50 DIN Stainless Steel	A75014985
LR1L50 ANSI Stainless Steel	A75014986
LR1L50 DIN Stainless Steel Fitted	A75015985
LR1L50 ANSI Stainless Steel Fitted	A75015986

LR1M90 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

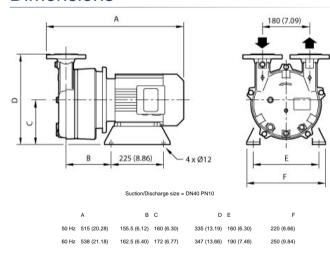
The LR1M90 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

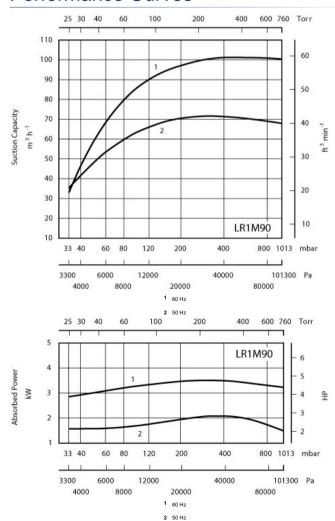
Dimensions



Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	70 m h -1	100 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	2.2 kW	4 kW
Service water flow	0.7 m ³ h ⁻¹	0.8 m ³ h ⁻¹
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Nitrided cast iron
Body	CF8M	Nitrided cast iron
Shaft	Motor	Motor
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR1M90 DIN Stainless Steel	A75020935
LR1M90 ANSI Stainless Steel	A75020936
LR1M90 DIN Stainless Steel Fitted	A75021935
LR1M90 ANSI Stainless Steel Fitted	A75021936
LR1M90 ANSI/NEMA Stainless Steel	A75026936
LR1M90 ANSI/NEMA Stainless Steel Fitted	A75027936
LR1L90 DIN Stainless Steel	A75023985
LR1L90 ANSI Stainless Steel	A75023986
LR1L90 DIN Stainless Steel Fitted	A75024985
LR1L90 ANSI Stainless Steel Fitted	A75024986

LR1M125 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

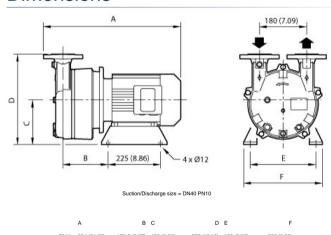
The LR1M125 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

Dimensions



181.5 (7.15) 172 (6.77)

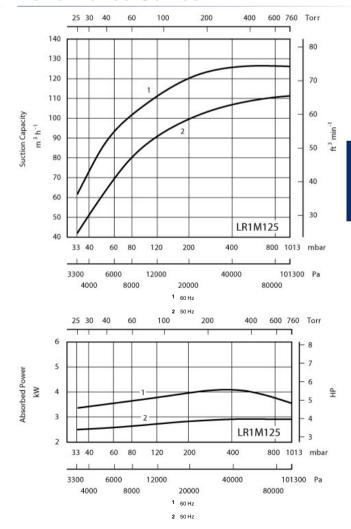
347 (13.66) 190 (7.48)

250 (9.84)

Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	100 m ³ h ⁻¹	120 m h -1
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	3 kW	4 kW
Service water flow	0.78 m ³ h ⁻¹	0.8 m ³ h ⁻¹
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	Motor	Motor
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR1M125 DIN Stainless Steel	A75029935
LR1M125 ANSI Stainless Steel	A75029936
LR1M125 DIN Stainless Steel Fitted	A75030935
LR1M125 ANSI Stainless Steel Fitted	A75030936
LR1M125 ANSI/NEMA Stainless Steel	A75035936
LR1M125 ANSI/NEMA Stainless Steel Fitted	A75036936
LR1L125 DIN Stainless Steel	A75032985
LR1L125 ANSI Stainless Steel	A75032986
LR1L125 DIN Stainless Steel Fitted	A75033985
LR1L125 ANSI Stainless Steel Fitted	A75033986

LR1M150 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

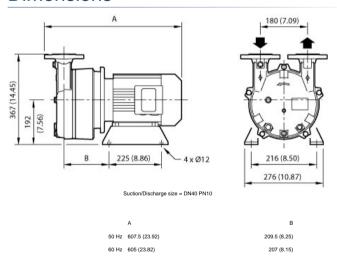
The LR1M150 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

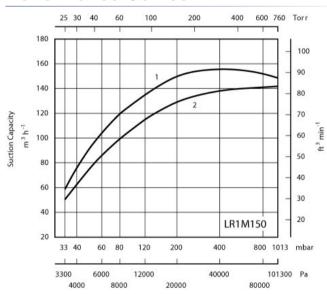
Dimensions

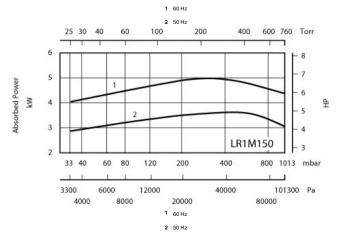


Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves





10

Performance details	50 Hz	60 Hz
Nominal capacity	130 m ³ h ⁻¹	160 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	4 kW	5.5 kW
Service water flow	0.8 m ³ h ⁻¹	$0.8 \text{m}^3 \text{h}^{-1}$
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	Motor	Motor
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR1M150 DIN Stainless Steel	A75038935
LR1M150 ANSI Stainless Steel	A75038936
LR1M150 DIN Stainless Steel Fitted	A75039935
LR1M150 ANSI Stainless Steel Fitted	A75039936
LR1M150 ANSI/NEMA Stainless Steel	A75044936
LR1M150 ANSI/NEMA Stainless Steel Fitted	A75045936
LR1L150 DIN Stainless Steel	A75041985
LR1L150 ANSI Stainless Steel	A75041986
LR1L150 DIN Stainless Steel Fitted	A75042985
LR1L150 ANSI Stainless Steel Fitted	A75042986

LR1M250 Single Stage Pumps

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

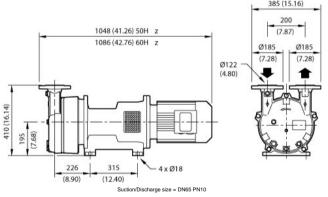
The LR1M250 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

Dimensions

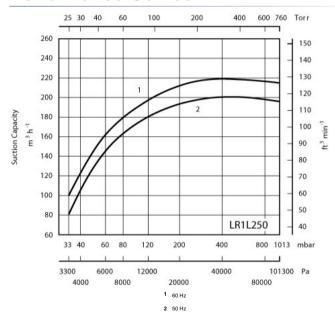


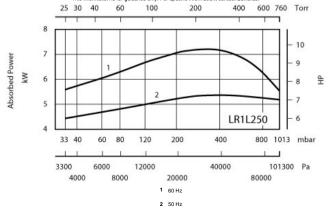
This information is for guidance only. For specific information, contact Edwards.

Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves





This information is for guidance only. For specific information, contact Edwards

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Performance details	50 Hz	60 Hz
Nominal capacity	200 m ³ h ⁻¹	220 m h -1
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	5.5 kW	7.5 kW
Service water flow	1.2 m ³ h ⁻¹	1.26 m ³ h ⁻¹
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S37	420S37
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR1M250 DIN Stainless Steel	A75047935
LR1M250 ANSI Stainless Steel	A75047936
LR1M250 DIN Stainless Steel Fitted	A75048935
LR1M250 ANSI Stainless Steel Fitted	A75048936
LR1M250 ANSI/NEMA Stainless Steel	A75053936
LR1M250 ANSI/NEMA Stainless Steel Fitted	A75054936
LR1L250 DIN Stainless Steel	A75050985
LR1L250 ANSI Stainless Steel	A75050986
LR1L250 DIN Stainless Steel Fitted	A75051985
LR1L250 ANSI Stainless Steel Fitted	A75051986

LR1L320 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

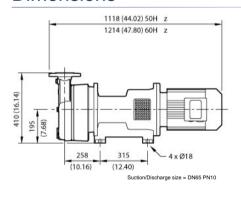
The LR1L320 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.

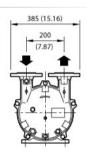


Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

Dimensions

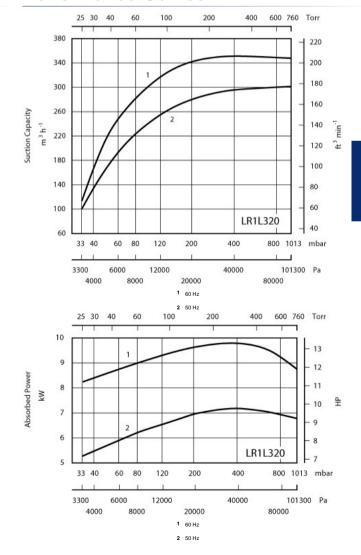




Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Technical Data

Performance details	50 Hz	60 Hz
Nominal capacity	300 m ³ h ⁻¹	330 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	7.5 kW	11 kW
Service water flow	1.26 m ³ h ⁻¹	1.45 m h -1

Materials of Stainless steel Stainless steel fitted construction Casing CF8M Cast iron CF8M Impeller CF8M CF8M Port plate Cast iron Body 420S37 Cast iron 420S37 Shaft CF8M Carbon / silicon Carbon / silicon Mechanical seal carbide / viton carbide / viton

Ordering Information

Product Description	Order No.
LR1L320 DIN Stainless Steel	A75056985
LR1L320 ANSI Stainless Steel	A75056986
LR1L320 DIN Stainless Steel Fitted	A75057985
LR1L320 ANSI Stainless Steel Fitted	A75057986

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LR1L450 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

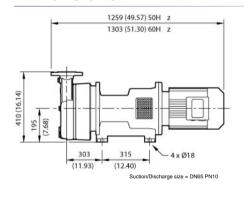
The LR1L450 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.

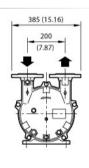


Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- Variable pitch dynamically balanced impeller for low noise and vibration level
- DIN 24960 mechanical seal

Dimensions

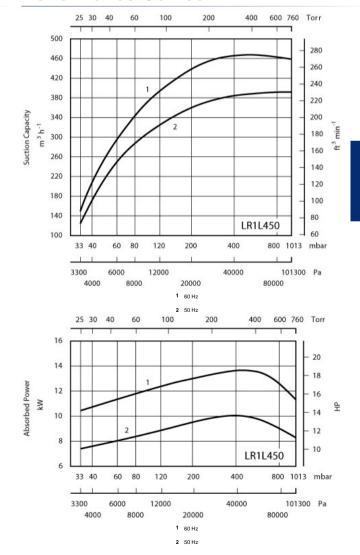




Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Technical Data

Performance details	50 Hz	60 Hz
Nominal capacity	370 m ³ h ⁻¹	440 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	11 kW	15 kW
Service water flow	1.45 m ³ h ⁻¹	1.45 m ³ h ⁻¹

Materials of Stainless steel Stainless steel fitted construction Casing CF8M Cast iron CF8M Impeller CF8M CF8M Port plate Cast iron Body CF8M Cast iron 420S37 Shaft 420S37 Carbon / silicon Carbon / silicon Mechanical seal carbide / viton carbide / viton

Ordering Information

Product Description	Order No.
LR1L450 DIN Stainless Steel	A75059985
LR1L450 ANSI Stainless Steel	A75059986
LR1L450 DIN Stainless Steel Fitted	A75060985
LR1L450 ANSI Stainless Steel Fitted	A75060986

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LR1S600 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

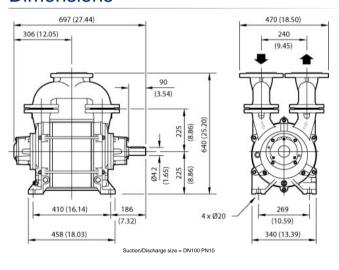
The LR1S600 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- DIN 24960 mechanical seal
- Externally mounted bearings

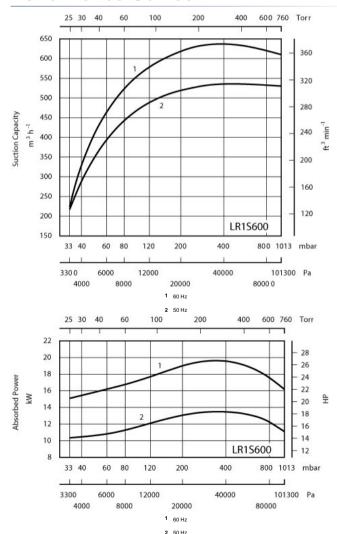
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Technical Data

Performance details	50 Hz	60 Hz	
Nominal capacity	540 m ³ h ⁻¹	625 m ³ h ⁻¹	
Nominal speed	1450 rpm	1750 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	15 kW	22 kW	
Service water flow	2 m ³ h ⁻¹	2.2 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	316
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR1S600 DIN Standard	A75061985
LR1S600 ANSI Standard	A75061986
LR1S600 DIN Stainless Steel	A75062985
LR1S600 ANSI Stainless Steel	A75062986
LR1S600 DIN Stainless Steel Fitted	A75063985
LR1S600 ANSI Stainless Steel Fitted	A75063986

LR1S800 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

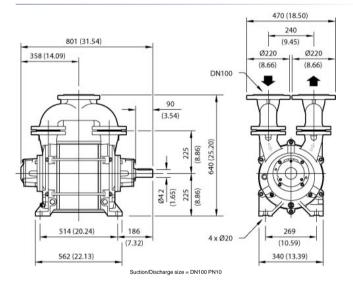
The LR1S600 DIN single stage liquid ring pump is capable of operation at 33 mbar A where required, but is most suited to applications with continuous operation at inlet pressures from atmospheric down to 100 mbar A.



Features & Benefits

- Pumps wet and dry gases
- Suction pressure to 33 mbar A
- Curved blade impeller and variable discharge port for optimum performance
- DIN 24960 mechanical seal
- Externally mounted bearings

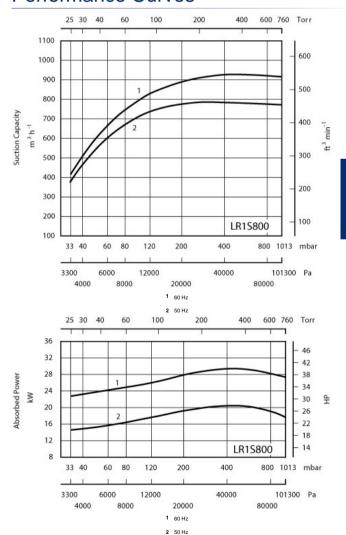
Dimensions



Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



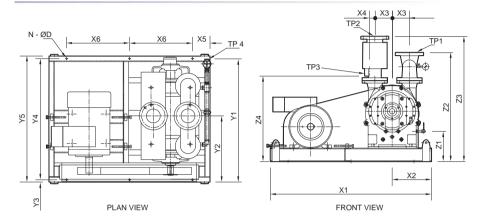
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Performance details	50 Hz	60 Hz	
Nominal capacity	540 m ³ h ⁻¹	625 m ³ h ⁻¹	
Nominal speed	1450 rpm	1750 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	15 kW	22 kW	
Service water flow	2 m ³ h ⁻¹	2.2 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	316
Mechanical seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

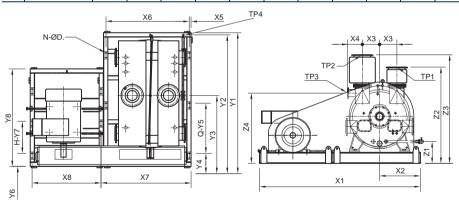
Product Description	Order No.
LR1S800 DIN Standard	A75064985
LR1S800 ANSI Standard	A75064986
LR1S800 DIN Stainless Steel	A75065985
LR1S800 ANSI Stainless Steel	A75065986
LR1S800 DIN Stainless Steel Fitted	A75066985
LR1S800 ANSI Stainless Steel Fitted	A75066986

The LR1A and LR1B single stage pumps are available in standard configured motorised packages, these packages have been designed to enable transportation in standard containers. The pump packages includes either a V-belt drive arrangement or an in-line gearbox as appropriate.

Dimensions



Size		X1	X2	Х3	X4	X5	Х6	Y1	Y2	Y3	Y4	Y5	Z 1	Z2	Z 3	Z 4	N	D
1	LR1A1600	1000	470	045	00	240	750	1272	763	29 1492	1400	1550	.0 005	4040	1425	979	6	40
I	LR1A2500	1920	470	215	80	210		1421	839		1330	335	1210	1425	979	6	19	
	LR1A4000							4000	005									
2	LR1B3500	2300	600	230	205	200	950	1992	995	29	1992	2050	317	1365	1540	1005	6	19
	LR1B4500							2050	1095									



Size		X1	X2	Х3	X4	X5	Х6	Х7	X8	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Z 1	Z2	Z 3	Z4	N	D
3	LR1A5500	2700	CCE	285	245	31	1500	1520	1120	2200	2064	1109	200	900	200	600	1600	274	1571	1774	1121	12	20
3	LR1B6000	2700	003	200	243	31	1500	1559	1130	2200	2223	993	200	900	200	000	1000	3/4	13/4	11//4	1134	12	20
	LR1A8000										2262	1260											
4	LR1B8000	3100	750	335	285	31	1630	1739	1330	2600	2202	1200	300	1000	300	700	2000	384	1829	2069	1324	12	20
	LR1B10000										2632	1445											
	LR1A12000										1754	1 16 1											
5	LR1B11000	3400	925	385	285	36	1920	2044	1320	3000	1754	1464	300	800	300	750	2100	495	2155	2440	1615	14	22
	LR1B13000										1954	1664											

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Size		X1	X2	ХЗ	X4	X5	Х6	Х7	X8	Y1	Y2	Y3	Y4	Y5	Y6	Y7
	LR1A16000		1688	1660												
6	LR1B15000	5850	1578	1880	435	370	875	2100	365	594	1015	2570	1900	2910	2120	1300
	LR1B18000		1453	2130												
	LR1A23000		1923	1985												
7	LR1B22000	6700	1773	2230	490	370	1025	2240	365	700	1200	2970	2245	3375	2455	1530
	LR1B30000		1643	2490												

Ordering Information

Product Description

Order No.

Contact Edwards or your local supplier to discuss your requirements with one of our sales engineers or product specialists.

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LR2S50 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

The LR2S50 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

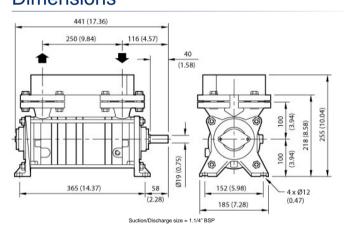


This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage

Features & Benefits

- Pumps wet and dry gases
- Higher efficiency at low pressures
- · Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

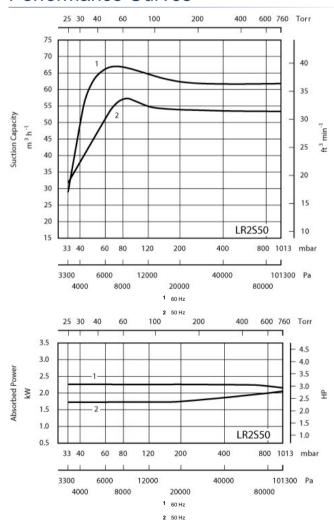
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	55 m h	65 m h -1
Nominal speed	2850 rpm	3450 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	2.2 kW	3 kW
Service water flow	0.8 m ³ h ⁻¹	0.8 m h

Materials of construction

Seal

Stainless steel fitted

Casing Cast iron
Impeller Bronze
Port plate Cast iron
Body Cast iron
Shaft 420S37

Carbon / silicon carbide / viton

Ordering Information

Product Description	Order No.
LR2S50 DIN Standard	A75101985
LR2S50 ANSI Standard	A75101986
LR2L50 DIN Standard	A75104985
LR2L50 DIN Standard	A75104986

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LR2S100 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

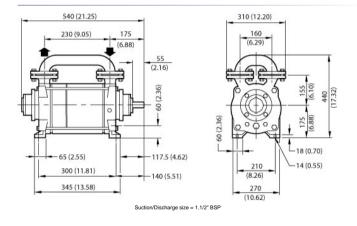
The LR2S100 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

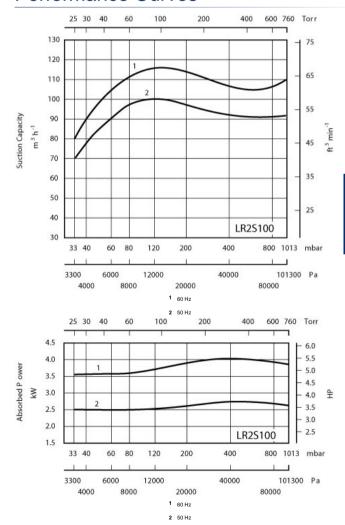
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	100 m ³ h ⁻¹	115 m ³ - 1
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	3 kW	4 kW
Service water flow	0.9 m ³ h ⁻¹	0.9 m ³ h ⁻¹
Inlet outlet connection size	40mm	1.5 inch
Materials of construction		
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S38
Seal	Carbon / silicon estroide / viton	Carbon / silicon carbide / viton

Ordering Information

Product Description	Order No.
LR2S100 DIN Stainless Steel	A75108985
LR2S100 DIN Stainless Steel Fitted	A75109985
LR2S100 ANSI Stainless Steel Fitted	A75109986
LR2S100 ANSI Stainless Steel	A75108986
LR2L100 DIN Stainless Steel	A75111985
LR2L100 ANSI Stainless Steel	A75111986
LR2L100 DIN Stainless Steel Fitted	A75112985
LR2L100 ANSI Stainless Steel Fitted	A75112986

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LR2S150 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

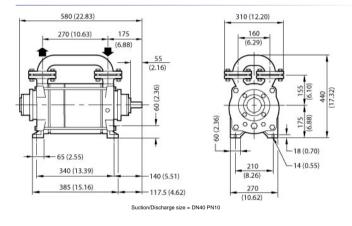
The LR2S150 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

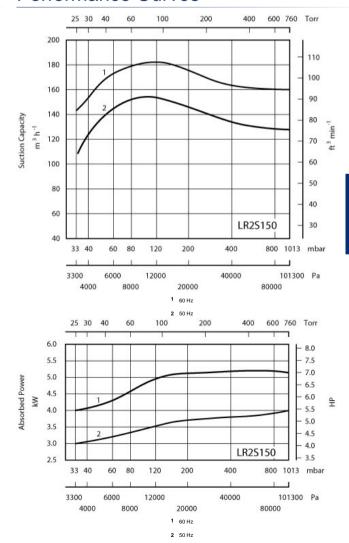
Dimensions



Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	150 m h	180 m h
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	4 kW	5.5 kW
Service water flow	0.95 m ³ h ⁻¹	0.95 m ³ h ⁻¹
Inlet outlet connection size	40mm	1.5 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S38
Seal	Carbon / silicon earbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S150 DIN Stainless Steel	A75114985
LR2S150 ANSI Stainless Steel	A75114986
LR2S150 DIN Stainless Steel Fitted	A75115985
LR2S150 ANSI Stainless Steel Fitted	A75115986
LR2L150 DIN Stainless Steel	A75117985
LR2L150 ANSI Stainless Steel	A75117986
LR2L150 DIN Stainless Steel Fitted	A75118985
LR2S150 ANSI Stainless Steel Fitted	A75118986

LR2S200 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

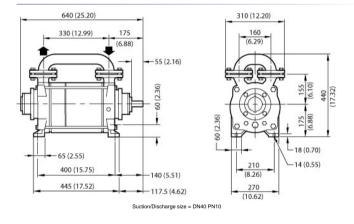
The LR2S200 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

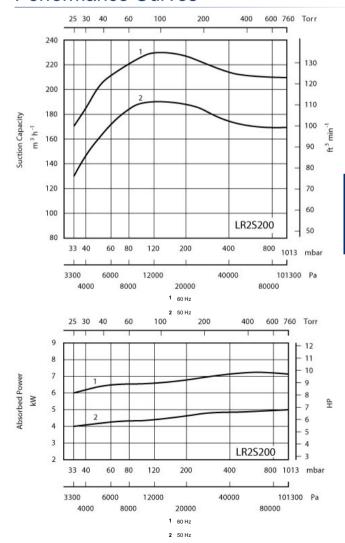
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	190 m ³ h ⁻¹	190 m ³ h ⁻¹
Nominal speed	1450 rpm	1450 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	5.5 kW	5.5 kW
Service water flow	1.1 m h -1	1.1 m ³ h ⁻¹
Inlet outlet connection size	40 mm	40 mm
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S200 DIN Stainless Steel	A75120985
LR2S200 ANSI Stainless Steel	A75120986
LR2S200 DIN Stainless Steel Fitted	A75121985
LR2S200 ANSI Stainless Steel Fitted	A75121986
LR2L200 DIN Stainless Steel	A75123985
LR2L200 ANSI Stainless Steel	A75123986
LR2L200 DIN Stainless Steel Fitted	A75124985
LR2L200 ANSI Stainless Steel Fitted	A75124986

LR2S275 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

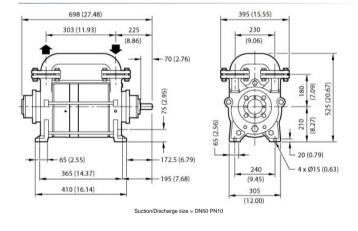
The LR2S275 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

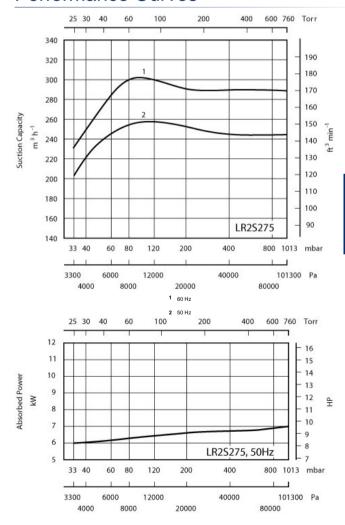
Dimensions



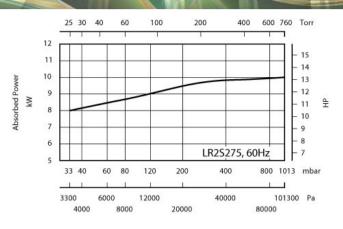
Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10



Performance details Nominal capacity Nominal speed Suction pressure Motor power Service water flow Inlet outlet connection size	50 Hz 260 m ³ h ⁻¹ 1450 rpm 33 mbar A 7.5 kW 2.1 m ³ h ⁻¹ 50 mm	60 Hz 300 m ³ h ⁻¹ 1750 rpm 33 mbar A 11 kW 2.1 m ³ h ⁻¹ 2 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Geal Carbon / silicon carbide / viton	

Product Description	Order No.
LR2S275 DIN Stainless Steel	A75126985
LR2S275 ANSI Stainless Steel	A75126986
LR2S275 DIN Stainless Steel Fitted	A75127985
LR2S275 ANSI Stainless Steel Fitted	A75127986
LR2L275 DIN Stainless Steel	A75129985
LR2L275 ANSI Stainless Steel	A75129986
LR2L275 DIN Stainless Steel Fitted	A75130985
LR2L275 ANSI Stainless Steel Fitted	A75130986

LR2S350 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

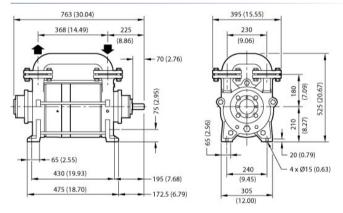
The LR2S350 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

Dimensions

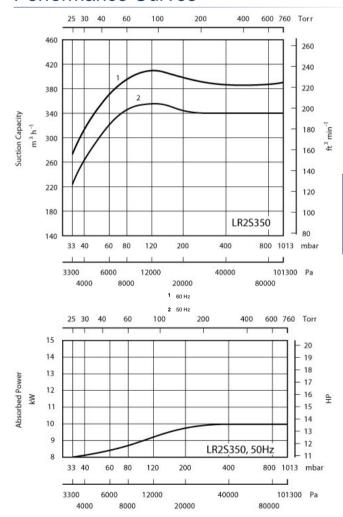


Suction/Discharge size = DN50 PN10

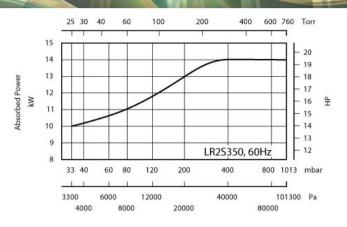
Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10



Danfannanaa dataila	50.11	00.11
Performance details	50 Hz	60 Hz
Nominal capacity	350 m ³ h ⁻¹	400 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	11 kW	15 kW
Service water flow	2.3 m h -1	2.3 m h -1
Inlet outlet connection size	50 mm	2 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton ®

Product Description	Order No.
LR2S350 DIN Stainless Steel	A75132985
LR2S350 ANSI Stainless Steel	A75132986
LR2S350 DIN Stainless Steel Fitted	A75133985
LR2S350 ANSI Stainless Steel Fitted	A75133986
LR2L350 DIN Stainless Steel	A75135985
LR2L350 ANSI Stainless Steel	A75135986
LR2L350 DIN Stainless Steel Fitted	A75136985
LR2L350 ANSI Stainless Steel Fitted	A75136986

LR2S425 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

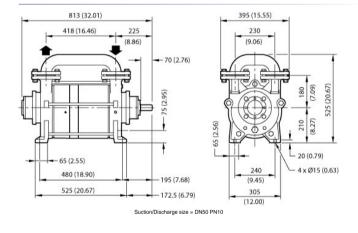
The LR2S425 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

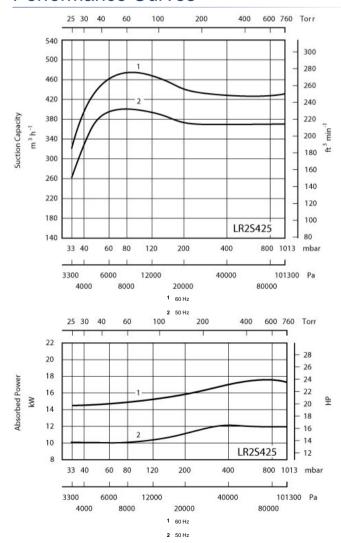
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	390 m ³ h ⁻¹	470 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	15 kW	18.5 kW
Service water flow	2.4 m ³ h ⁻¹	2.4 m ³ h ⁻¹
Inlet outlet connection size	50 mm	2 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S425 DIN Stainless Steel	A75138985
LR2S425 ANSI Stainless Steel	A75138986
LR2S425 DIN Stainless Steel Fitted	A75139985
LR2S425 ANSI Stainless Steel Fitted	A75139986
LR2L425 DIN Stainless Steel	A75141985
LR2L425 ANSI Stainless Steel	A75141986
LR2L425 DIN Stainless Steel Fitted	A75142985
LR2L425 ANSI Stainless Steel Fitted	A75142986

LR2S600 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

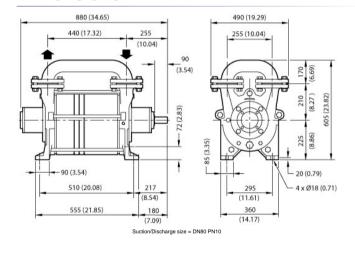
The LR2S600 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

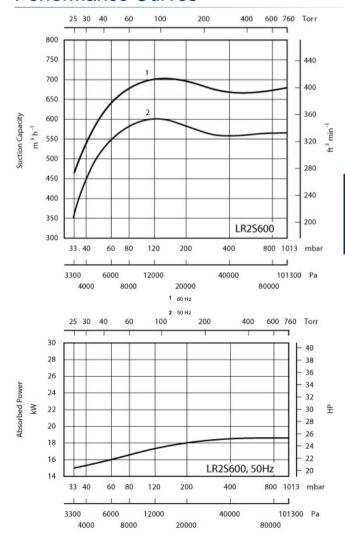
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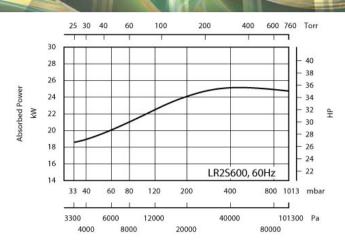
Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10



Performance details	50 Hz	60 Hz
Nominal capacity	600 m ³ h ⁻¹	700 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	18.5 kW	22 kW
Service water flow	2.7 m ³ h ⁻¹	2.7 m ³ h ⁻¹
Inlet outlet connection size	80 mm	3 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Carbon / silicon	Carbon / silicon

Product Description	Order No.
LR2S600 DIN Stainless Steel	A75144985
LR2S600 ANSI Stainless Steel	A75144986
LR2S600 DIN Stainless Steel Fitted	A75145985
LR2S600 ANSI Stainless Steel Fitted	A75145986

LR2S750 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

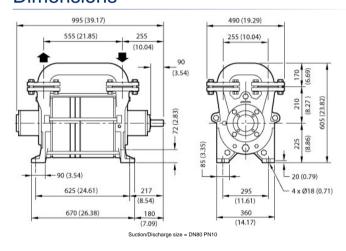
The LR2S750 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- · Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

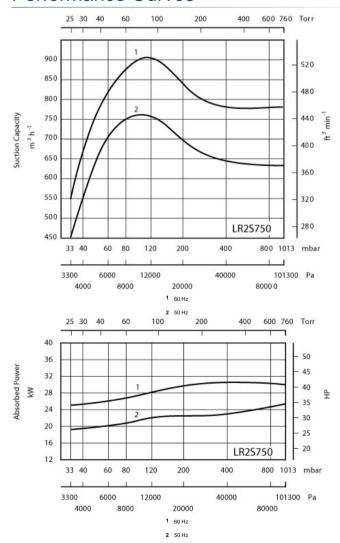
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz
Nominal capacity	760 m ³ h ⁻¹	900 m ³ h ⁻¹
Nominal speed	1450 rpm	1750 rpm
Suction pressure	33 mbar A	33 mbar A
Motor power	30 kW	37 kW
Service water flow	3.4 m ³ h ⁻¹	3.4 m ³ h ⁻¹
Inlet outlet connection size	80 mm	3 inch
Materials of construction	Stainless steel	Stainless steel fitted
Casing	CF8M	Cast iron
Impeller	CF8M	CF8M
Port plate	CF8M	Cast iron
Body	CF8M	Cast iron
Shaft	420S38	420S39
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Ordering Information

Product Description	Order No.
LR2S750 DIN Stainless Steel	A75147985
LR2S750 ANSI Stainless Steel	A75147986
LR2S750 DIN Stainless Steel Fitted	A75148985
LR2S750 ANSI Stainless Steel Fitted	A75148986

10

LR2S1000 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

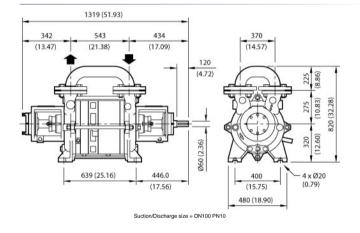
The LR2S1000 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

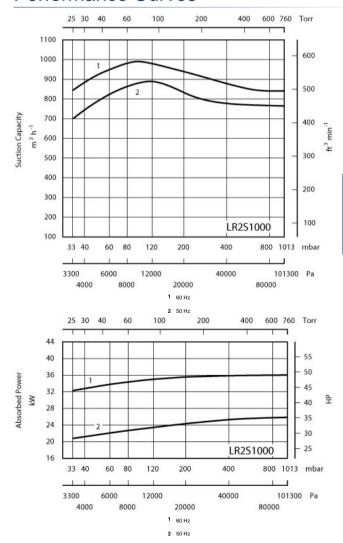
Dimensions



Applications

- · Chemical processing
- · Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	890 m ³ h ⁻¹	980 m ³ h ⁻¹	
Nominal speed	960 rpm	1150 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	30 kW	45 kW	
Service water flow	7 m ³ h ⁻¹	7 m ³ h ⁻¹	
Inlet outlet connection size	890 m ³ h ⁻¹	980 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S1000 DIN Standard	A75149985
LR2S1000 ANSI Standard	A75149986
LR2S1000 DIN Stainless Steel	A75150985
LR2S1000 ANSI Stainless Steel	A75150986
LR2S1000 DIN Stainless Steel Fitted	A75151985
LR2S1000 ANSI Stainless Steel Fitted	A75151986

LR2S1250 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

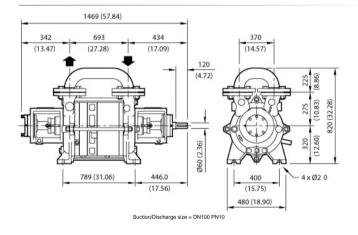
The LR2S1250 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- · Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

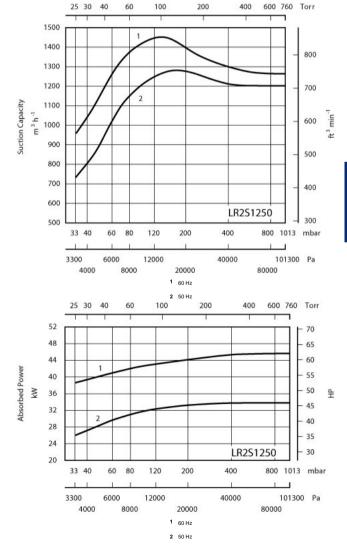
Dimensions



Applications

- hemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	1250 m ³ h ⁻¹	1440 m ³ h ⁻¹	
Nominal speed	960 rpm	1150 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	37 kW	55 kW	
Service water flow	9 m ³ h ⁻¹	9 m ³ h ⁻¹	
Inlet outlet connection size	1250 m ³ h ⁻¹	1440 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S1250 DIN Standard	A75152985
LR2S1250 ANSI Standard	A75152986
LR2S1250 DIN Stainless Steel	A75153985
LR2S1250 ANSI Stainless Steel	A75153986
LR2S1250 DIN Stainless Steel Fitted	A75154985
LR2S1250 ANSI Stainless Steel Fitted	A75154986

LR2S1750 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

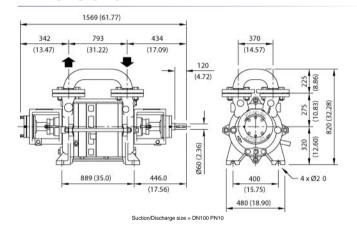
The LR2S1750 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

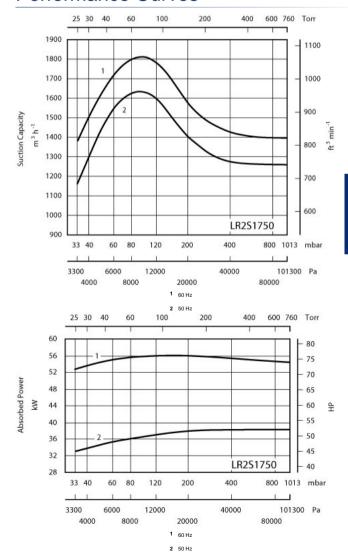
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	1600 m ³ h ⁻¹	1800 m ³ h ⁻¹	
Nominal speed	960 rpm	1150 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	45 kW	75 kW	
Service water flow	9 m ³ h ⁻¹	9 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S1750 DIN Standard	A75155985
LR2S1750 ANSI Standard	A75155986
LR2S1750 DIN Stainless Steel	A75156985
LR2S1750 ANSI Stainless Steel	A75156986
LR2S1750 DIN Stainless Steel Fitted	A75157985
LR2S1750 ANSI Stainless Steel Fitted	A75157986

LR2S2000 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

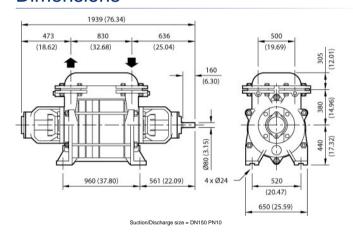
The LR2S2000 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

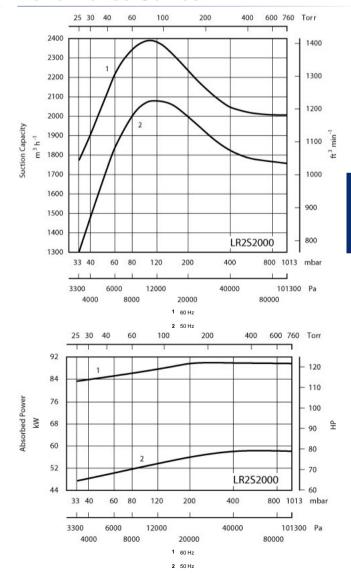
Dimensions



Applications

- Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	2000 m ³ h ⁻¹	2300 m ³ h ⁻¹	
Nominal speed	735 rpm	735 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	75 kW	110 kW	
Service water flow	14 m h 1	14 m h -1	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton®

Product Description	Order No.
LR2S2000 DIN Standard	A75158985
LR2S2000 ANSI Standard	A75158986
LR2S2000 DIN Stainless Steel	A75159985
LR2S2000 ANSI Stainless Steel	A75159986
LR2S2000 DIN Stainless Steel Fitted	A75160985
LR2S2000 ANSI Stainless Steel Fitted	A75160986

LR2S2500 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

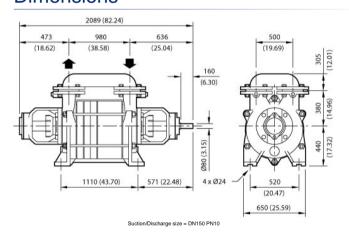
The LR2S2500 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

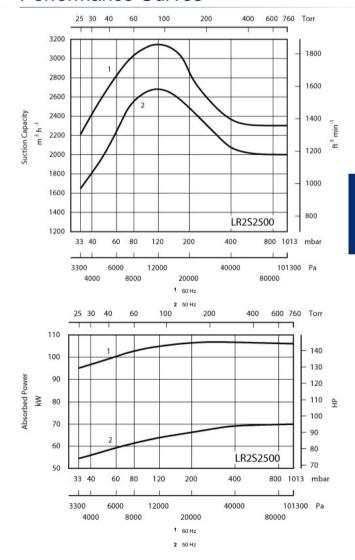
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	2600 m ³ h ⁻¹	3000 m ³ h ⁻¹	
Nominal speed	735 rpm	880 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	90 kW	132 kW	
Service water flow	15 m ³ h ⁻¹	15 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	Bronze	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton®

Product Description	Order No.
LR2S2500 DIN Standard	A75161985
LR2S2500 ANSI Standard	A75161986
LR2S2500 DIN Stainless Steel	A75162985
LR2S2500 ANSI Stainless Steel	A75162986
LR2S2500 DIN Stainless Steel Fitted	A75163985
LR2S2500 ANSI Stainless Steel Fitted	A75163986

LR2S3500 Liquid Ring Pump

Liquid ring vacuum pumps continue to provide the optimum solution for many rough vacuum applications in the chemical and allied process industries. The general reliability, low maintenance requirements, low vibration and noise levels coupled with the unique capabilities when handling wet gases all contribute to the popularity of the pump.

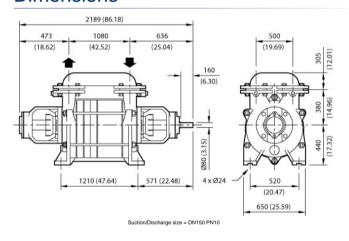
The LR2S3500 DIN two stage liquid ring pump is most effective on applications with continuous operation below 100 mbar A.

This pump can be supplied as part of a standard package incorporating an IEC Eurovoltage 220-240/380-415V, 3 phase, 50 Hz, IP55, Class F, B3/B5 motor, baseplate and seal liquid

Features & Benefits

- Pumps wet and dry gases
- · Higher efficiency at low pressures
- Selection of materials to suit application
- DIN 24960 mechanical seal
- Simple rugged design

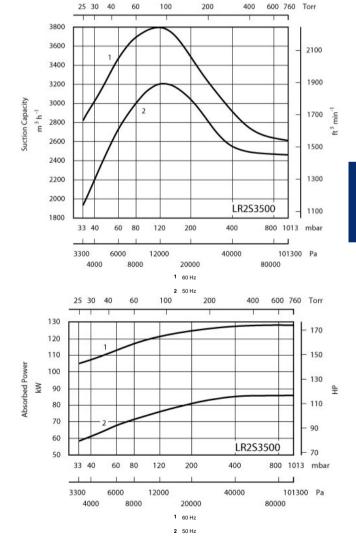
Dimensions



Applications

- · Chemical processing
- Food processing and packaging
- Pharmaceutical production
- · Oil exploration and refining
- Glass industry

Performance Curves



10

Performance details	50 Hz	60 Hz	
Nominal capacity	3000 m h -1	3700 m ³ h ⁻¹	
Nominal speed	735 rpm	880 rpm	
Suction pressure	33 mbar A	33 mbar A	
Motor power	110 kW	150 kW	
Service water flow	18 m ³ h ⁻¹	18 m ³ h ⁻¹	
Materials of construction	Standard	Stainless steel	Stainless steel fitted
Casing	Cast iron	CF8M	Cast iron
Impeller	304SS	CF8M	CF8M
Port plate	Cast iron	CF8M	Cast iron
Body	Cast iron	CF8M	Cast iron
Shaft	420S37	316	420S37
Seal	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton	Carbon / silicon carbide / viton

Product Description	Order No.
LR2S3500 DIN Standard	A75164985
LR2S3500 ANSI Standard	A75164986
LR2S3500 DIN Stainless Steel	A75165985
LR2S3500 ANSI Stainless Steel	A75165986
LR2S3500 DIN Stainless Steel Fitted	A75166985
LR2S3500 ANSI Stainless Steel Fitted	A75166986

Edwards offers a full range of liquid ring pumps. The LR1A200 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

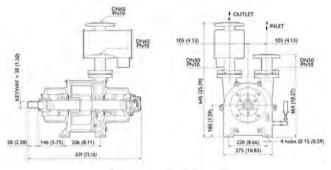
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions

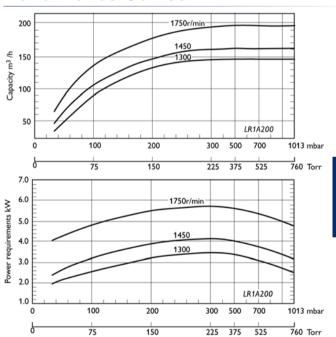


Flanges available to both DIN and ANSI standards

Applications

The LR1A200 is ideal for filtration, vacuum forming, general industrial and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	170 m ³ /hr	200 m ³ /hr
	100 CFM	120 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	1450 rpm	1750 rpm
Nominal motor power	5.5 kW	7.5 kW
	7.5 HP	10 HP

Ordering Information

Product Description	Order No.
LR1A200 Liquid Ring Pump	LR1A200

10

LR1A300 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1A300 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

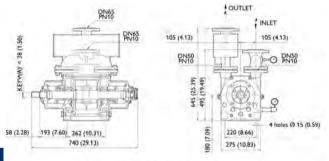
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions

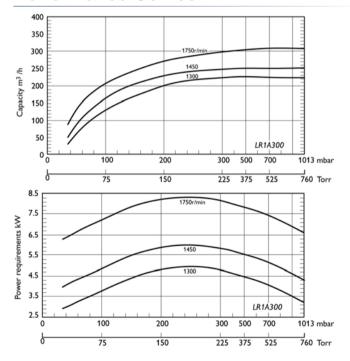


Flanges available to both DIN and ANSI standard

Applications

The LR1A300 is ideal for filtration, vacuum forming, general industrial and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	260 m ³ /hr	320 m ³ /hr
	150 CFM	180 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	1450 rpm	1750 rpm
Nominal motor power	7.5 kW	11 kW
	10 HP	15 HP

Ordering Information

Product Description	Order No.
LR1A300 Liquid Ring Pump	LR1A300

10

Edwards offers a full range of liquid ring pumps. The LR1A400 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

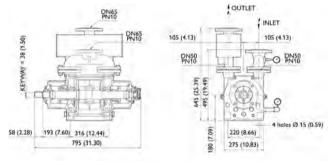
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.



Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions

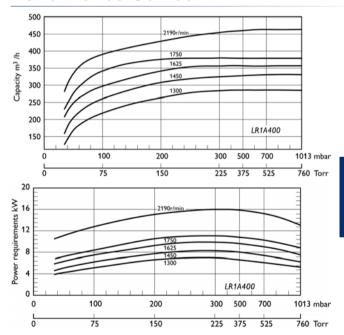


Flanges available to both DIN and ANSI standard:

Applications

The LR1A400 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	350 m ³ /hr	420 m ³ /hr
	205 CFM	250 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	1450 rpm	1750 rpm
Nominal motor power	11 kW	15 kW
	15 HP	20HP

Ordering Information

Product Description	Order No.
LR1A400 Liquid Ring Pump	LR1A400



Edwards offers a full range of liquid ring pumps. The LR1A500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

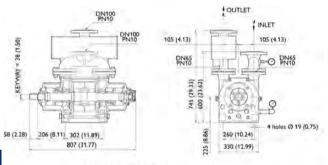
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- · Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions

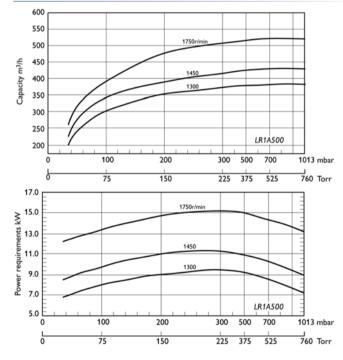


Flanges available to both DIN and ANSI standard

Applications

The LR1A500 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming, general industrial and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	430 m ³ /hr	530 m ³ /hr
	250 CFM	300 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	1450 rpm	1750 rpm
Nominal motor power	15 kW	18.5 kW
	20 HP	25 HP

Ordering Information

Product Description	Order No.
LR1A500 Liquid Ring Pump	LR1A500

10

Edwards offers a full range of liquid ring pumps. The LR1A700 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.



Applications

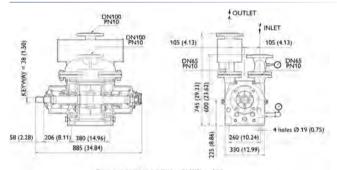
The LR1A700 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

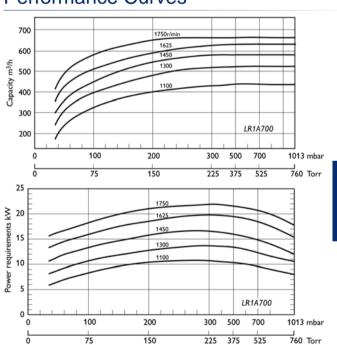
- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions



Flanges available to both DIN and ANSI standards

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	600 m ³ /hr	690 m ³ /hr
	350 CFM	420 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	1450 rpm	1750 rpm
Nominal motor power	18.5 kW	22 kW
	25 HP	30 HP

Ordering Information

Product Description	Order No.
LR1A700 Liquid Ring Pump	LR1A700



Edwards offers a full range of liquid ring pumps. The LR1A800 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

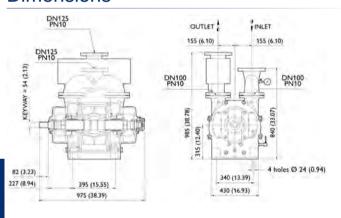
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

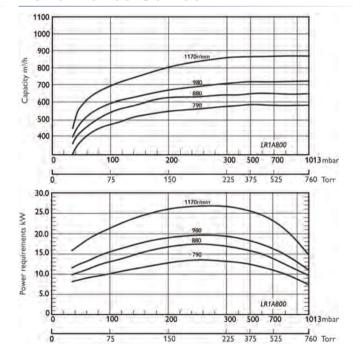
Dimensions



Applications

The LR1A800 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	780 m ³ /hr	900 m ³ /hr
	460 CFM	550 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	980 rpm	1170 rpm
Nominal motor power	22 kW	30 kW
	30 HP	40 HP

Ordering Information

Product Description	Order No.
LR1A800 Liquid Ring Pump	LR1A800

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Edwards offers a full range of liquid ring pumps. The LR1A1200 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

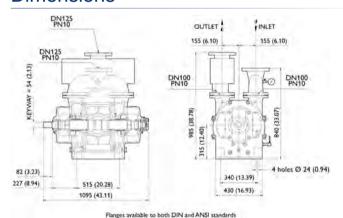
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.



Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- Split packing gland design to facilitate repacking
- Internal and external seal flushing options

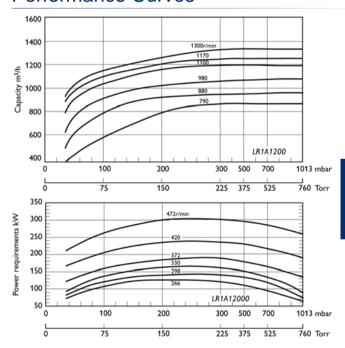
Dimensions



Applications

The LR1A1200 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	1110 m ³ /hr	1300 m ³ /hr
	650 CFM	780 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	980 rpm	1170 rpm
Nominal motor power	37 kW	45 kW
	50 HP	60 HP

Ordering Information

Product Description	Order No.
LR1A1200 Liquid Ring Pump	LR1A1200

10



Edwards offers a full range of liquid ring pumps. The LR1A1300 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

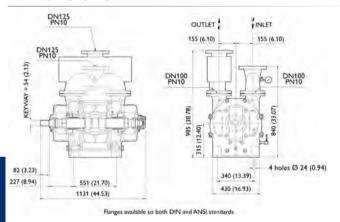
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- · Packed gland, single and double mechanical seal options
- · Split packing gland design to facilitate repacking
- Internal and external seal flushing options

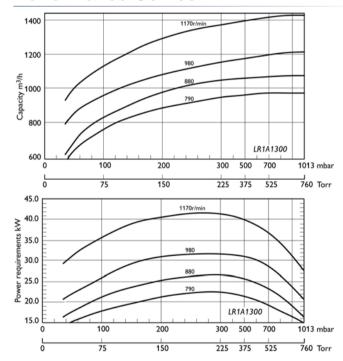
Dimensions



Applications

The LR1A1300 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	1200 m ³ /hr	1400 m ³ /hr
	700 CFM	850 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	980 rpm	1170 rpm
Nominal motor power	37 kW	45 kW
	50 HP	60 HP

Ordering Information

Product Description	Order No.
LR1A1300 Liquid Ring Pump	LR1A1300

10

Edwards offers a full range of liquid ring pumps. The LR1A1600 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.



Applications

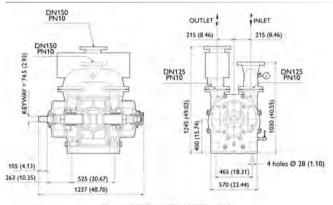
The LR1A1600 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

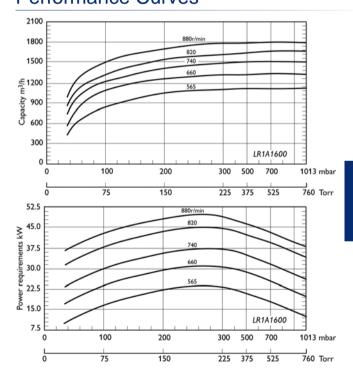
- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- Split packing gland design to facilitate repacking
- Internal and external seal flushing options

Dimensions



Flanges available so both DIN and ANSI standards

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	1550 m ³ /hr	1800 m ³ /hr
	900 CFM	1100 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	740 rpm	880 rpm
Nominal motor power	45 kW	55 kW
	60 HP	75 HP

Ordering Information

Product Description	Order No.
LR1A1600 Liquid Ring Pump	LR1A1600

Edwards offers a full range of liquid ring pumps. The LR1A2500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

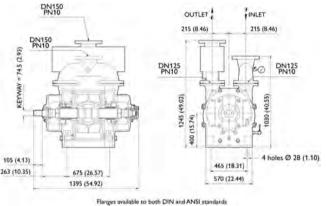
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Packed gland, single and double mechanical seal options
- Split packing gland design to facilitate repacking
- Internal and external seal flushing options

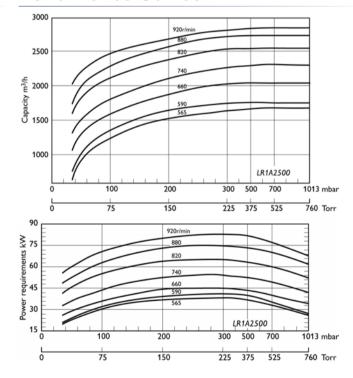
Dimensions



Applications

The LR1A2500 is ideal for condenser evacuation, pulp and paper, filtration, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	2500 m ³ /hr	2800 m ³ /hr
	1500 CFM	1700 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	740 rpm	880 rpm
Nominal motor power	75 kW	90 kW
	100 HP	125 HP

Ordering Information

Product Description	Order No.
LR1A2500 Liquid Ring Pump	LR1A2500

10

Edwards offers a full range of liquid ring pumps. The LR1A4000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

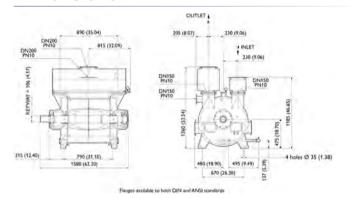


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

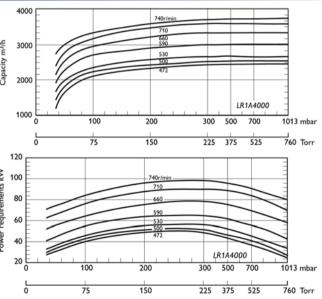
Dimensions



Applications

The LR1A4000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
	30 112	00 112
Nominal capacity (saturated)	4000 m ³ /hr	3800 m ³ /hr
	2350 CFM	2250 CFM
Suction pressure	33 mbar	33 mbar
	25 Torr	25 Torr
Nominal speed	740 rpm	710 rpm
Nominal motor power	110 kW	110 kW
	150 HP	150 HP

Ordering Information

Product Description	Order No.
LR1A4000 Liquid Ring Pump	LR1A4000

Edwards offers a full range of liquid ring pumps. The LR1A5000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

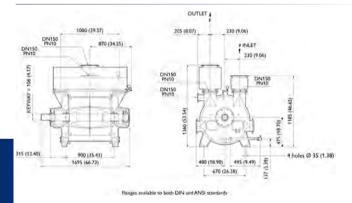
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

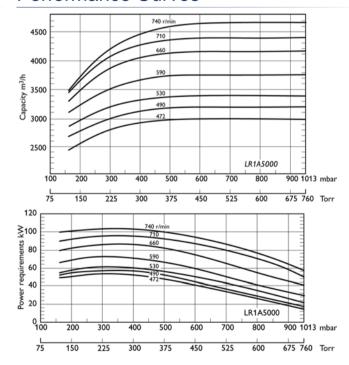
Dimensions



Applications

The LR1A5000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	4600 m ³ /hr	4400 m ³ /hr
	2700 CFM	2600 CFM
Suction pressure	160 mbar	160 mbar
	120 Torr	120 Torr
Nominal speed	740 rpm	710 rpm
Nominal motor power	110 kW	110 kW
	150 HP	150 HP

Ordering Information

Product Description	Order No.
LR1A5000 Liquid Ring Pump	LR1A5000

10

Edwards offers a full range of liquid ring pumps. The LR1A5500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

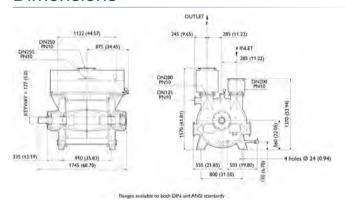


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

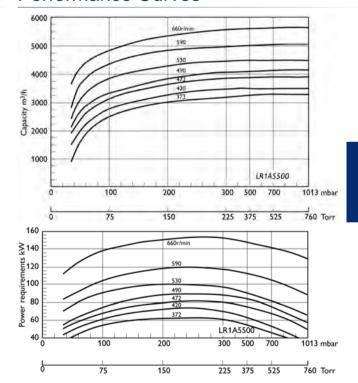
Dimensions



Applications

The LR1A5500 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity	5300 m ³ /hr,	5300 m ³ /hr,
(saturated)	3100 CFM	3100 CFM
Suction pressure	33 mbar/25 Torr	33 mbar/25 Torr
Nominal speed	590 rpm	580 rpm
Motor power	132 kW/200 HP	132 kW/200 HP

Ordering Information

Product Description	Order No.
LR1A5500 Liquid Ring Pump	LR1A5500

10

LR1A6500 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1A6500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

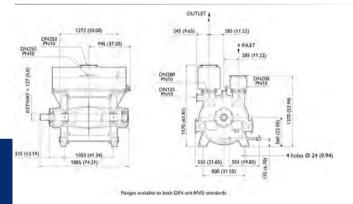
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

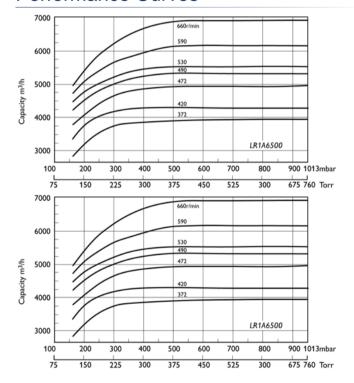
Dimensions



Applications

The LR1A6500 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity	6200 m ³ /hr,	6200 m ³ /hr,
(saturated)	3700 CFM	3700 CFM
Suction pressure	160 mbar/120 Torr	160 mbar/120 Tori
Nominal speed	590 rpm	580 rpm
Motor power	160 kW/200 HP	160 kW/200 HP

Ordering Information

Product Description	Order No.
LR1A6500 Liquid Ring Pump	LR1A6500

10

Edwards offers a full range of liquid ring pumps. The LR1A8000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

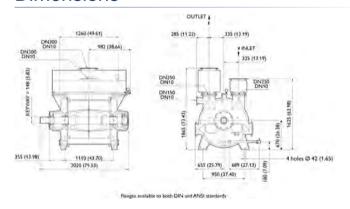


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

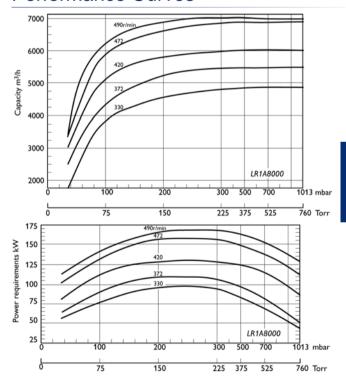
Dimensions



Applications

The LR1A8000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity	7700 m ³ /hr,	7700 m ³ /hr,
(saturated)	4500 CFM	4500 CFM
Suction pressure	33 mbar/25 Torr	33 mbar/25 Torr
Nominal speed	490 rpm	500 rpm
Motor power	185 kW/250 HP	185 kW/250 HP

Ordering Information

Product Description	Order No.
LR1A8000 Liquid Ring Pump	LR1A8000

10



Edwards offers a full range of liquid ring pumps. The LR1A10000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

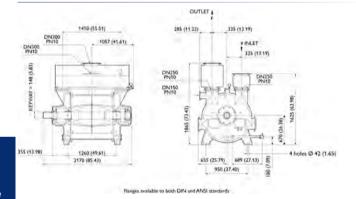
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

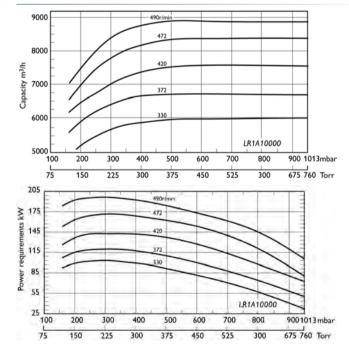
Dimensions



Applications

The LR1A10000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz	60 Hz
Nominal capacity (saturated)	9000 m ³ /hr	9000 m ³ /hr
	5300 CFM	5300 CFM
Suction pressure	160 mbar	160 mbar
	120 Torr	120 Torr
Nominal speed	490 rpm	500 rpm
Nominal motor power	160 kW	160 kW
	200 HP	200 HP

Ordering Information

Product Description	Order No.
LR1A10000 Liquid Ring Pump	LR1A10000

10

Edwards offers a full range of liquid ring pumps. The LR1A12000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

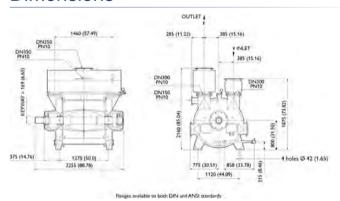


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

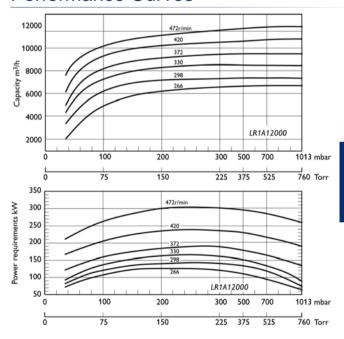
Dimensions



Applications

The LR1A12000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	11700 m ³ /hr
	6900 CFM
Suction pressure	33 mbar
	25 Torr
Nominal speed	470 rpm
Nominal motor power	315 kW
	450 HP

Ordering Information

Product Description	Order No.
LR1A12000 Liquid Ring Pump	LR1A12000

LR1A13000 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1A13000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

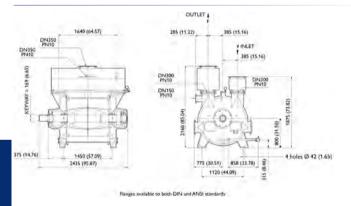
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

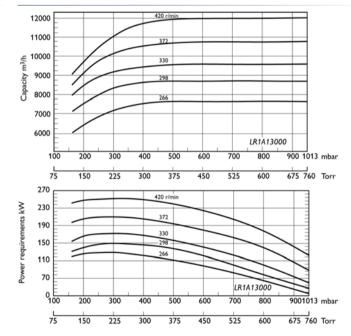
Dimensions



Applications

The LR1A13000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	12600 m ³ /hr
	7400 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	440 rpm
Nominal motor power	280 kW
	400 HP

Ordering Information

Product Description	Order No.
LR1A13000 Liquid Ring Pump	LR1A13000

Edwards offers a full range of liquid ring pumps. The LR1A16000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

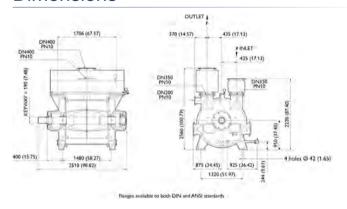


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

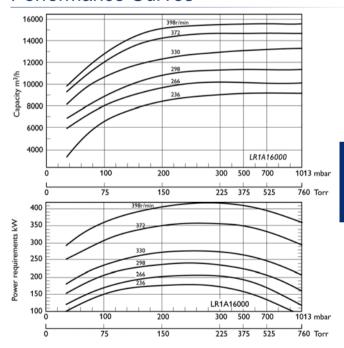
Dimensions



Applications

The LR1A16000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	16200 m ³ /hr
	9500 CFM
Suction pressure	33 mbar
	25 Torr
Nominal speed	390 rpm
Nominal motor power	450 kW
	600 HP

Ordering Information

Product Description	Order No.
LR1A16000 Liquid Ring Pump	LR1A16000

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LR1A19000 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1A19000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

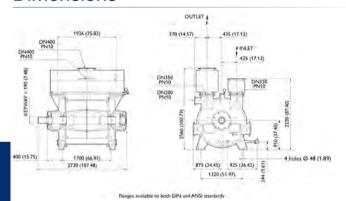
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

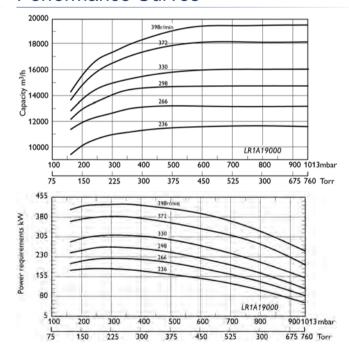
Dimensions



Applications

The LR1A19000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	19200 m ³ /hr
	11300 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	390 rpm
Nominal motor power	450 kW
	600 HP

Ordering Information

Product Description	Order No.
LR1A19000 Liquid Ring Pump	LR1A19000

10

Edwards offers a full range of liquid ring pumps. The LR1A23000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

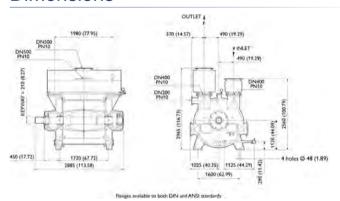


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

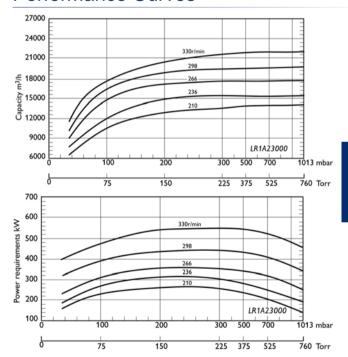
Dimensions



Applications

The LR1A23000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	22800 m ³ /hr
	13400 CFM
Suction pressure	33 mbar
	25 Torr
Nominal speed	320 rpm
Nominal motor power	710 kW
	1000 HP

Ordering Information

Product Description	Order No.
LR1A23000 Liquid Ring Pump	LR1A23000

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LR1A26000 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1A26000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

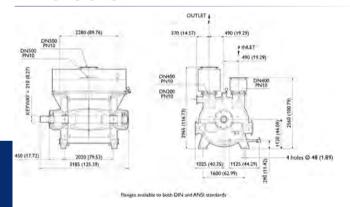
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1A Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

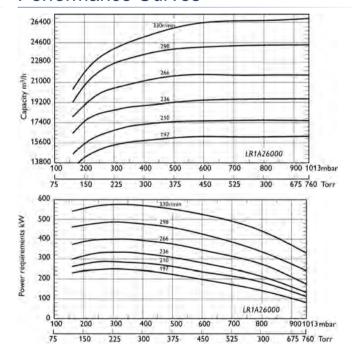
Dimensions



Applications

The LR1A26000 is ideal for condenser evacuation, pulp and paper, filtration, flue gas desulphurization, vacuum forming and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	26100 m ³ /hr
	15300 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	320 rpm
Nominal motor power	710 kW
	1000 HP

Ordering Information

Product Description	Order No.
LR1A26000 Liquid Ring Pump	LR1A26000

Edwards offers a full range of liquid ring pumps. The LR1B3500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

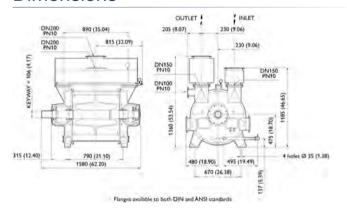


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

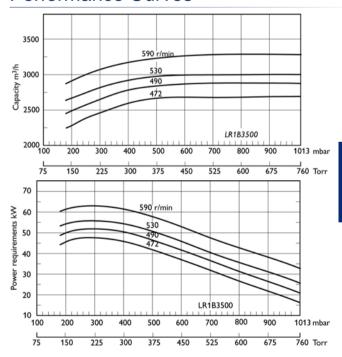
Dimensions



Applications

The LR1B3500 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	3300 m ³ /hr
	1900 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	590 rpm
Nominal motor power	75 kW
	100 HP

Ordering Information

Product Description	Order No.
LR1B3500 Liquid Ring Pump	LR1B3500

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Edwards offers a full range of liquid ring pumps. The LR1B4500 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

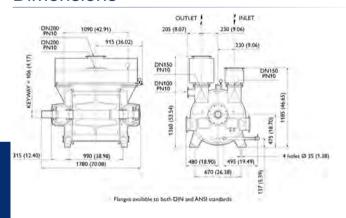
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

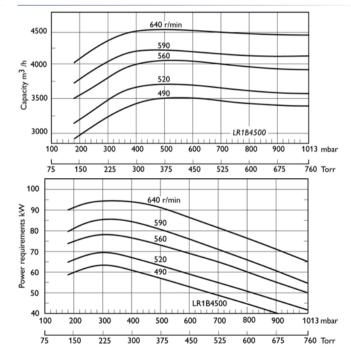
Dimensions



Applications

The LR1B4500 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	4500 m ³ /hr
	2800 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	640 rpm
Nominal motor power	110 kW
	150 HP

Ordering Information

Product Description	Order No.
LR1B4500 Liquid Ring Pump	LR1B4500

Edwards offers a full range of liquid ring pumps. The LR1B6000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

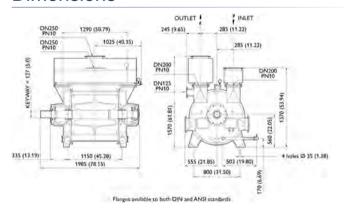


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

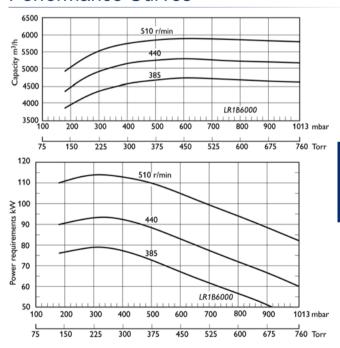
Dimensions



Applications

The LR1B6000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	6000 m ³ /hr
	3500 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	510 rpm
Nominal motor power	132 kW
	200 HP

Ordering Information

Product Description	Order No.
LR1B6000 Liquid Ring Pump	LR1B6000

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Edwards offers a full range of liquid ring pumps. The LR1B8000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

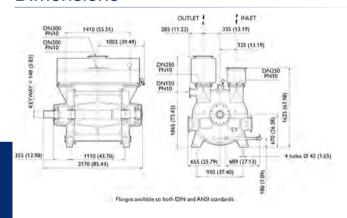
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- · Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

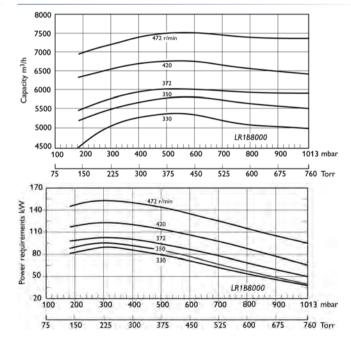
Dimensions



Applications

The LR1B8000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	7800 m ³ /hr
	4600 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	472 rpm
Nominal motor power	185 kW
	250 HP

Ordering Information

Product Description	Order No.
LR1B8000 Liquid Ring Pump	LR1B8000

Edwards offers a full range of liquid ring pumps. The LR1B10000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

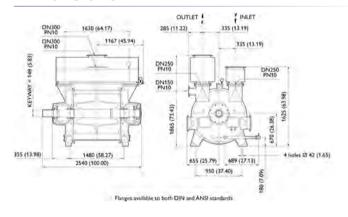


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- · Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

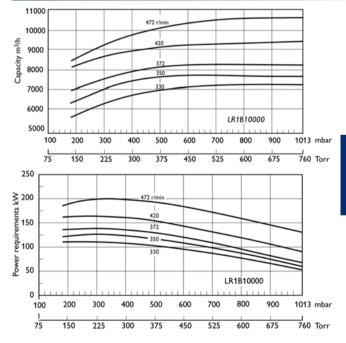
Dimensions



Applications

The LR1B10000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	10500 m ³ /hr
	6200 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	472 rpm
Nominal motor power	220 kW
	300 HP

Ordering Information

Product Description	Order No.
LR1B10000 Liquid Ring Pump	LR1B10000

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Edwards offers a full range of liquid ring pumps. The LR1B11000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

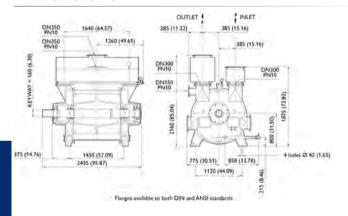
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

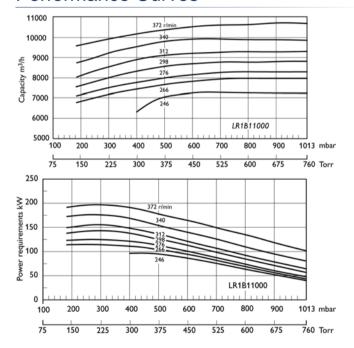
Dimensions



Applications

The LR1B11000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	10800 m ³ /hr
	6300 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	372 rpm
Nominal motor power	220 kW
	300 HP

Ordering Information

Product Description	Order No.
LR1B11000 Liquid Ring Pump	LR1B11000

Edwards offers a full range of liquid ring pumps. The LR1B13000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

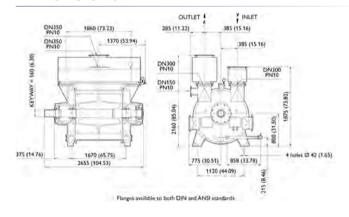


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

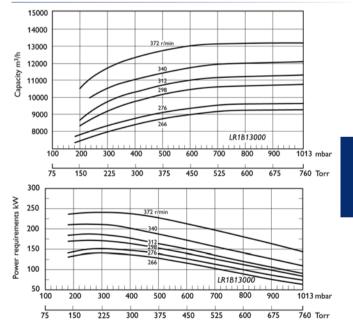
Dimensions



Applications

The LR1B13000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	13500 m ³ /hr
	7900 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	372 rpm
Nominal motor power	250 kW
	350 HP

Ordering Information

Product Description	Order No.
LR1B13000 Liquid Ring Pump	LR1B13000

LR1B15000 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1B15000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

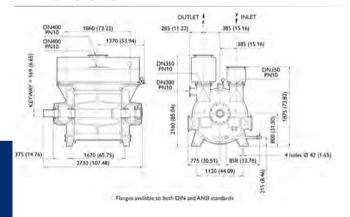
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- Packed gland, single and double mechanical seal options

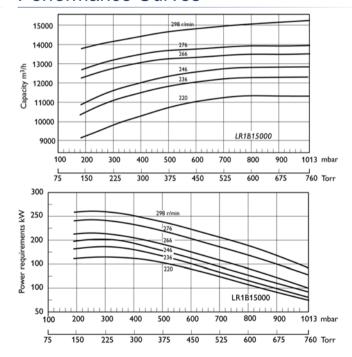
Dimensions



Applications

The LR1B15000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	15300 m ³ /hr
	9000 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	298 rpm
Nominal motor power	280 kW
	400 HP

Ordering Information

Product Description	Order No.
LR1B15000 Liquid Ring Pump	LR1B15000

Edwards offers a full range of liquid ring pumps. The LR1B18000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

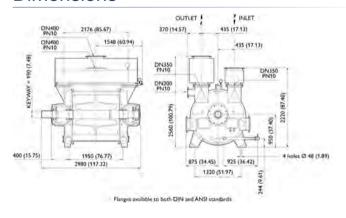


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

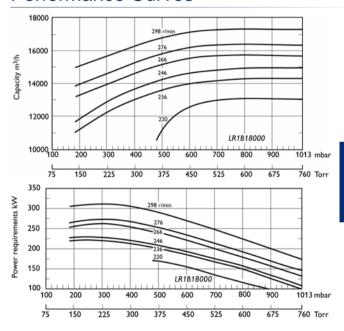
Dimensions



Applications

The LR1B18000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	17400 m ³ /hr
	10000 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	298 rpm
Nominal motor power	355 kW
	500 HP

Ordering Information

Product Description	Order No.
LR1B18000 Liquid Ring Pump	LR1B18000

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LR1B22000 Liquid Ring Pump



Edwards offers a full range of liquid ring pumps. The LR1B22000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

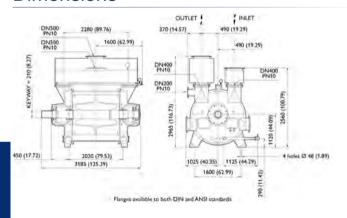
All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

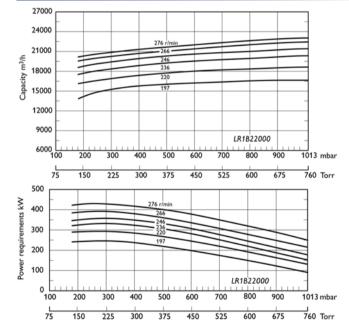
Dimensions



Applications

The LR1B22000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

	50 Hz / 60 Hz
Nominal capacity (saturated)	22800 m ³ /hr
	13400 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	276 rpm
Nominal motor power	500 kW
	650 HP

Ordering Information

Product Description	Order No.
LR1B22000 Liquid Ring Pump	LR1B22000

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Edwards offers a full range of liquid ring pumps. The LR1B30000 provides a single-stage design and curved blade impellor with reinforcing rings for improved ruggedness, reducing noise and vibration.

All of our liquid ring pumps handle wet or dry gases, with high tolerance to liquid carry over. The LR1B Series has an enhanced bearing design enabling reduced internal clearances for improved efficiency. Pumps are available in cast iron and 316 stainless steel construction as standard with other materials and corrosion resistant coatings available.

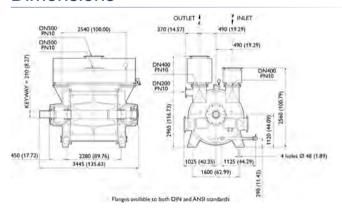


All are tested to DIN 28431:1987 and are available as part of ATEX Category 1 and 2 T4

Features & Benefits

- Optional central partition enabling dual vacuum duty operation
- Variable area discharge port for optimum performance at all inlet pressures
- Flange-mounted casing construction for extra rigidity
- Top and side inlet/outlet flange options for installations with limited headroom
- · Packed gland, single and double mechanical seal options

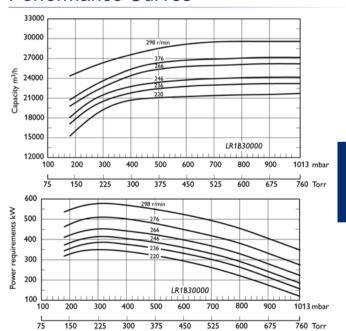
Dimensions



Applications

The LR1B30000 is ideal for fly ash conveying, pulp and paper, filtration, flue gas desulphurization, methane extraction in mining and chemical and petrochemical applications.

Performance Curves



Technical Data

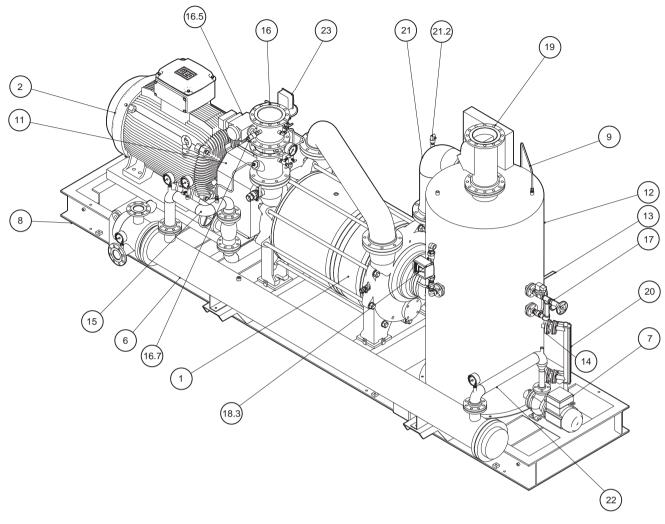
	50 Hz / 60 Hz
Nominal capacity (saturated)	30000 m ³ /hr
	17600 CFM
Suction pressure	160 mbar
	120 Torr
Nominal speed	312 rpm
Nominal motor power	560 kW
	750 HP

Ordering Information

Product Description	Order No.
LR1B30000 Liquid Ring Pump	LR1B30000

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Edwards have developed a range of standard packages based upon the SHR series of two stage liquid ring pumps. The packages are designed to meet air leakage rates in the HEI Standards for Steam Surface Condensers.



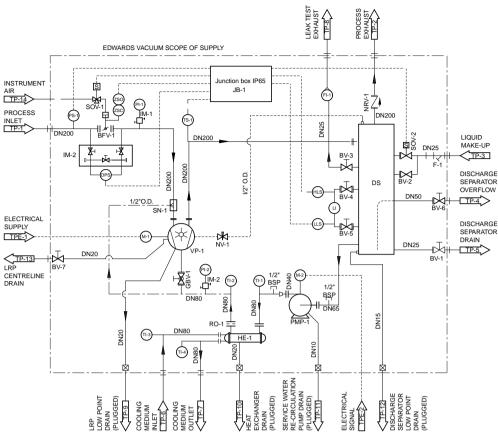
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Page 496 Liquid ring pumps are very effective when pumping wet gases and condensable vapors and are able to operate across the entire pressure range from atmospheric pressure to 1 inch Hgabs, this gives maximum flexibility in meeting the required condenser backing pressure under various operating conditions. A guide to pump selection can be seen in the table below, this shows the pump size required to achieve 1 inch Hgabs with varying ITD's (Initial Temperature Difference) between the condenser cooling water and the condenser outlet temperature. For more information on pump performance against specific operating conditions please contact your local customer care office.

HEI / Liquid Ring Pump Selection Chart at 33.86 mbar A with Varying Condenser ITD

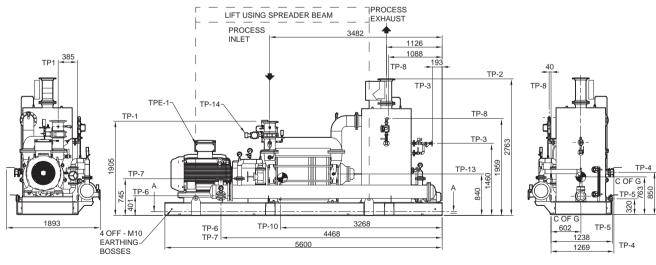
ITD HEI SCFM	10 °C	11 °C	13 °C	15 °C	17 °C
5	SHR2750	SHR2400	SHR2400	SHR2400	SHR2400
7.5	SHR2950	SHR2750	SHR2750	SHR2400	SHR2400
10	SHR2950	SHR2950	SHR2750	SHR2750	SHR2750
12.5	SHR2950	SHR2950	SHR2950	SHR2750	SHR2750
15	SHR21200	SHR21200	SHR2950	SHR2950	SHR2950
17.5	SHR21850	SHR21200	SHR21200	SHR2950	SHR2950
20	SHR21850	SHR21850	SHR21200	SHR21200	SHR2950
25	SHR22500	SHR21850	SHR21850	SHR21200	SHR21200
30	SHR22500	SHR22500	SHR21850	SHR21850	SHR21850
40	SHR22500	SHR22500	SHR22500	SHR22500	SHR21850

The standard package includes all of the associated equipment required to operate the pump package, including the transition from hogging to holding duty.



Features & Benefits

- Two stage liquid ring pump for optimum performance supporting the steam condenser outlet pressure
- Automatic inlet isolating valve controlled by differential switch for effective transition from hogging to holding
- Inlet water spray nozzle to reduce condensable load at pump suction
- Interstage cavitation control valve to reduce cavitation when operating at pressures close to the seal water vapor pressure
- Carbon steel discharge separator complete with level control and discharge air flow measuring capability
- Shell and tube heat exchanger with large diameter stainless steel tubes - maintaining efficiency by minimising fouling and corrosion
- Seal water recirculation pump to optimize seal water flow rate
- · Welded carbon steel piping to minimise leaks
- Electric motor standard or specific to customer requirements
- On skid junction box single point electrical connection.



Model	Pump	SCFM	HP	kW	Α	В	С
CEP750-2	SHR2400	5 - 7.5	40	22	2350	1000	1500
CEP1000-2	SHR2750	7.5 - 12.5	75	45	3750	1350	2000
CEP1500-2	SHR2950	10 - 20	100	55	3750	1350	2000
CEP2000-2	SHR21200	15 - 25	125	75	4500	1500	2500
CEP3000-2	SHR21850	20 - 30	175	110	4500	1500	2500
CEP6000-2	SHR22500	25 - 40	225	132	5500	1700	3000

Waterbox and circulated water pump priming

The ability to handle wet gases without detrimental effect makes liquid ring vacuum pumps ideal for this priming application. The pumps are used initially to carry out priming of the main condenser water boxes and CW pump; once this is complete they are used to maintain vacuum in the water box at the required level.

The removal of air from the condenser waterbox prevents accumulation of air in the upper parts of the cooling tube bundle, thereby preventing air locks and maintaining the effective cooling surface of the condenser, ensuring maximum cooling efficiency.

The Edwards priming system is a modular design comprising three component parts: vacuum pumps, vacuum receiver and priming valve and accessories, which are supplied as required to meet customer specifications.

The vacuum pump system comprises a single stage liquid ring pump complete with a total seal water recirculation system, sized to meet the process duty requirements. If duty and standby pumpsets are called for, then two systems are provided, giving true standby capability including the seal water recirculation system.

The vacuum receiver vessel is complete with a pressure transmitter to control the pump operation and includes an automatic drain tank arrangement to remove any water carry over from the system, therefore avoiding corrosion. If required, a priming valve and associated accessories can be supplied for each condenser vacuum connection: the priming valve helps to prevent cycling of the vacuum system and minimises carryover of cooling water.

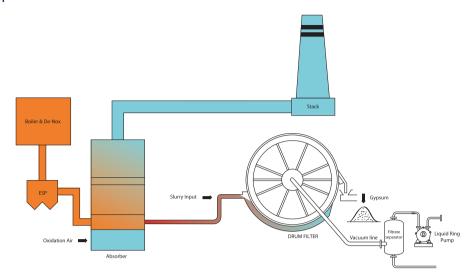
Additional connections can be made to the vacuum receiver to enable main cooling water pumps to be primed before operation.



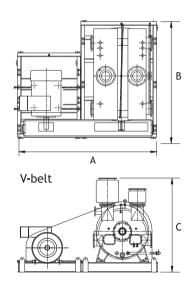
Waterbox priming LRP set

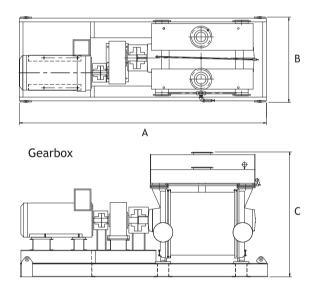
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Flue Gas Desulphurisation

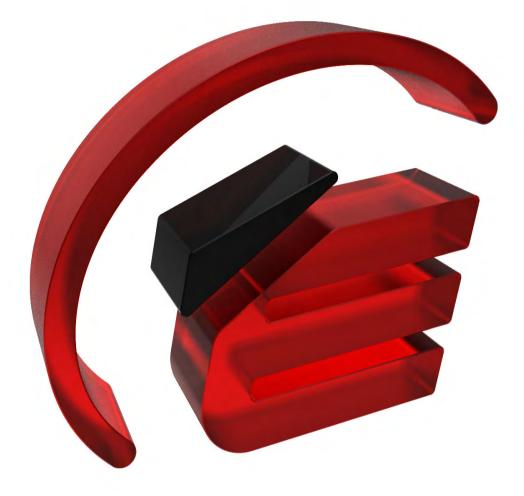


Flue Gas Desulphurisation systems are a common feature on modern coal fired power plants, a by-product of the process is gypsum which is produced at the outlet of a scrubber. Liquid ring pumps are used to provide vacuum on the dewatering of the gypsum on a vacuum filter, usually belt or rotary drum type. The liquid ring pump, typically a large single stage design, is selected based upon the surface area of the vacuum filter. The table below shows the pump model for a selection of nominal capacities, for optimum pump selection please contact your local Edwards sales office.

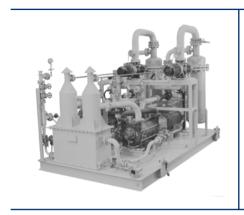




Nominal Capacity m ³ h ⁻¹	Pump Size	Motor Size kW	Motor Size HP	Drive Type	Α	В	С
2500	LR1A2500	55	75	V-belt	1920	1550	1425
5000	LR1A5000	110	150	V-belt	2300	2050	1540
6500	LR1A6500	160	220	V-belt	2700	2200	1774
10000	LR1A10000	200	270	V-belt	3100	2600	2069
13000	LR1A13000	330	450	V-belt	3400	3000	2440
19000	LR1B18000	355	475	Gearbox	5850	2100	2910
30000	LR1B30000	710	950	Gearbox	6500	2240	3375
37000	LR1B38000	800	1000	Gearbox	7000	2500	3500



Process Vacuum







11

Steam Ejector Vacuum Systems

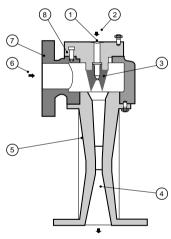
Edwards has over 90 years experience in the design and supply of steam ejector systems. Edwards has been instrumental in the development of the steam ejector from the relatively crude single stage devices which evolved into today's highly efficient multi-stage systems.

Process and mechanical design expertise is combined with project management skills for the supply of individual items of plant, or the execution of total projects including installation and commissioning. The company has an immense reputation in applications including the following:

- Refinery Vacuum Systems
- Vacuum Distillation Units
- Flash Evaporation for Seawater Crystallization Desalination
- Turbine Condenser Air Extraction
- · Edible Oil Processing
- Polymerization
- · Evaporative Cooling

Features of the Steam Ejector Solution

- Low capital cost
- No moving parts
- Low maintenance
- Wide choice of materials
- No close clearances
- No size limitation
- Ability to handle large vapor load
- Liquid slugs do not cause mechanical damage
- Not sensitive to suction temperature



- Strainer
- Motive steam
- Nozzle
- Diffuser Suction
- Vapor Head

Range

Ejectors can be arranged as multi-stage systems with interstage condensers, which may be the direct contact type (jet condenser) or surface type (shell and tube). The multi-stage arrangements allows lower suction pressures to be achieved than could be produced by a single stage ejector. Interstage condensers economize on the use of motive steam, since the operating steam from stages upstream of the condenser is condensed leaving only saturated incondensable gases to be handled by the succeeding stage or stages.



Operating Pressure

Single Stage 150 - 130 mbar Two Stage 25 - 15 mbar Three Stage 10 - 7 mbar Four Stage 1 mbar Five Stage 0.1 mbar

As ejectors can be economically manufactured on an individual basis to suit specific customer needs they have a wide capacity range, which is limited only by the manufacturing techniques relevant to the material of construction, typically this range would be between $10 - 1.5 \times 10^6 \text{ m}^3 \text{h}^{-1}$.



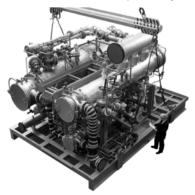


Interstage Jet Condensers

Jet or spray type condensers operate by condensing steam by direct contact with the cooling water. This type of condenser can be located at barometric height or at low level using a condensate extraction pump. Jet condensers tend to use less cooling water than surface types, although as the ejected vapors are in contact with the cooling water the treatment of any resulting effluent must be considered.

Interstage Surface Condensers

Surface condensers of the shell and tube type perform the same function as jet types, however the ejector steam and process vapors are condensed on the tube surfaces without contact with the cooling water, greatly reducing the potential effluent problem. Removable end covers on the condensers allow easy cleaning of the tubes.



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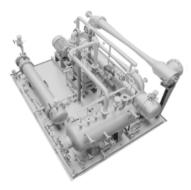
Shop online at www.edwardsvacuum.com

Deaeration Equipment

Multistage Ejector/Liquid Ring Pump Combinations

Edwards are able to offer combinations of steam ejectors and liquid ring pumps where the liquid ring pump replaces the final stage or stages of a steam ejector system.

This enables large vapor/gas flows to be handled at the low pressures associated with multi-stage steam ejector sets whilst substantially reducing steam consumption and hence operating costs.



Ejector and ejector liquid ring pump combinations can be supplied using Edwards designed liquid ring pumps. The depth of experience in both types of equipment allows optimization of the equipment both in performance and economy of utilities.

Applications and Design Services

Edwards offers a comprehensive design service based on unrivalled process vacuum experience, application knowledge and design

In order to propose a solution the following information is required at the enquiry stage:

- Suction flow
- Composition and Molecular weight
- Suction pressure
- Discharge temperature
- System volume
- Evacuation time
- Discharge pressure
- Motive pressure and temperature, max-normal-min
- Cooling water temperature, max-normal-min
- Type of condenser direct or
- Type of installation Barometric or low level
- Materials of construction
- Design codes applicable

Edwards experience in water deaeration equipment spans more than 70 years, serving essentially two markets and applications:

Seawater deaerators for water injection systems for secondary recovery of oil from offshore reservoirs

Boiler feedwater and process deaeration for power generation plants, boilers and process use

Seawater Deaerators

Secondary recovery by means of water injection is frequently an essential feature of crude oil production. It is often a crucial factor in achieving and sustaining economically viable production rates.

The source of the water is dependant on the location of the production facility and could be from a subsurface source such as produced water or an aquifer, or from a surface source such as the sea or a

The latter two sources, as with most surface waters, normally contain substantial levels of dissolved oxygen. In order to control corrosion rates in downstream plant and to inhibit bacterial growth this oxygen must be removed before the water is used for injection.

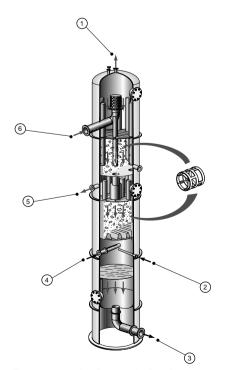
Edwards is able to provide extensively proven deaeration technology to facilitate the removal of this oxygen to levels such that the remaining residual may be economically removed by the addition of a chemical scavenger.

The following options are available:

- · Spray/pack deaerators
- · Packed column deaerators
- · Trace gas stripping deaerators

Spray/pack Deaerators

Although conventional packed bed deaerators offer a satisfactory solution in many circumstances, the unique Edwards spray packed deaerator technology offers significant advantages over conventional designs. It affords additional benefits for FPSO installations because the mass transfer efficiency of the spray section is unaffected by wave motion and by any foaming of the water as it enters the deaerator.



- First stage vapor take-off Oxygen scavenger
- Water outlet
- Second stage vapor take-off

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This patented design offers many benefits over conventional deaerators and compact deaerator designs including the following:

- Substantial height and weight reduction compared to conventional vacuum stripping columns
- May be used upstream of sulphate reduction membranes, since it can operate without the addition of anti-foam chemicals
- Unaffected by any motion of the installation, making it the preferred technology for FPSO applications
- There is no reliance on catalysts, which have a limited life span and may be poisoned
- There is no requirement for storage and/or production of hazardous combustible products such as methanol or hydrogen.
- Extensively field-proven technology, with over 50 units utilizing the spray distributor supplied for water injection service

Packed Column Deaerators

This conventional design uses well-proven technology and remains the industry standard for both onshore and offshore applications worldwide



The design is suitable for both vacuum and gas stripping applications with corrosion resistant tower internals designed for foam retention, efficient liquid and gas phase distribution and redistribution, in order to maximize mass transfer efficiency.

Trace Gas Stripping Deaerators

This patented system combines vacuum stripping and inert gas stripping to offer a unit that operates under vacuum with the mass transfer process being assisted by a small quantity of inert gas admitted into the deaerator column.

This process allows highly compact deaerator columns to be used whilst the required vacuum pump capacity is substantially lower than would be associated with conventional vacuum stripping deaerators.

Deaeration and the use of Sulphate Removal Systems

Edwards is able to offer field proven designs for water injection deaerators, which are required to operate upstream of sulphate removal systems. Such installations require that the deaerator must operate without antifoam agents since the use of such agents in incompatible with the membranes used in the sulphate removal system.



Edwards has supplied units to replace conventional packed column deaerator designs supplied by other manufacturers that have proved to be incapable of operating at the required design conditions without the use of antifoam agents. Our ability to offer proven technologies, which provide enhanced mass transfer capability can enable existing deaerator vessels to be re-used in order to minimize the cost and downtime associated with the upgrade.

Sulphate removal systems may be installed upstream of the deaerator in which case antifoam agents may be used, however this location upstream of the deaerator column has many serious disadvantages, which include:

- Materials of construction of the sulphate removal system must be suitable for service in contact with undeaerated seawater
- Presence of oxygen in the seawater will increase the risk of oxidation of the membranes and/or the possibility of aerobic bacteria or algae growth on the membranes
- Additional precautions to ensure the removal of any hydrocarbons present in the water may be necessary prior to the sulphate removal system to ensure that these do not contact the membranes

Deaeration on Floating Production Vessels

Edwards has considerable experience in the supply of deaeration packages for use on floating production vessels, including installations on FPSO's, semi-submersibles and on tension leg platforms.

These production facilities require that the deaeration package is insensitive to the motion of the installation and that the height and weight of the package together with the elevation of the center of gravity above grade level are minimized.

Our deaeration technology includes designs that are ideally suited to such floating production facilities, with references available for these types of installations at locations around the world, in conditions ranging from offshore Canada to Equatorial Africa.

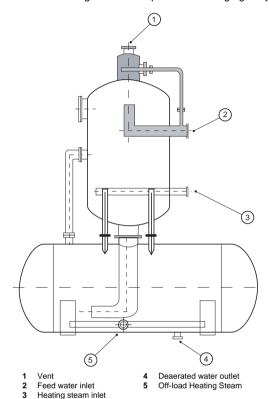
Boiler Feedwater and Process Water Deaerators

The types of deaerator described have been developed over years of experience of the different types required for numerous industrial applications. Examples of some of the industries where deaeration is

Power Stations - treating boiler feed water.

Oil Refineries and Chemical Plants - treating boiler feed water and process deaeration.

Breweries – deaerating water in the production of high gravity beer.

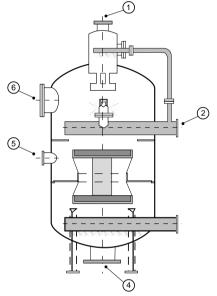


High Level Pressure Deaerators

For modern industrial installations where heat economy is essential, and where even lower oxygen contents are demanded to avoid costly maintenance work, the pressure heater/deaerator system is used where inlet boiler feed water is heated to well above atmospheric boiling point.

Edwards has developed a system of sprays and trays such that the feed water enters the deaerator through an atomizing spray valve assembly into the upper volume of the deaerator vessel where primary deaeration takes place. The feed then falls over a series of trays to the base of the deaerator during the course of which secondary deaeration takes placed.

Heating steam is admitted via a diffuser positioned below the tray assembly to ensure ultimate heating effect and optimum scrubbing action so as to produce residual oxygen contents down to 0.007 p.p.m. or less. This deaerating section is mounted on a storage compartment such that the whole system can be mounted at a suitable height to obtain the required suction head on the boiler feed pump advised by the manufacturer.



- Vent
- Feed water inlet
- Heating steam inlet
- Discharge to storage vessel
- Balance pipe return Manway

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Shelf Dryers







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Stokes Vacuum Shelf Dryers Model 438



Stokes Model 438 vacuum shelf dryer

Edwards has over 90 years experience in the design of dryers for the chemical, pharmaceutical, plastics and metallurgical industries and has pioneered the design of heated shelves for vacuum shelf dryers.

Stokes Model 438 Shelf Dryers

Edwards Shelf Dryers provide rapid drying of heat sensitive, air sensitive, pyrophoric, and other materials that require drying without agitation. The dryer chamber features heated shelves (see below) which are sealed by use of an O-ring contained in a machined groove in the chamber door. The chamber assembly includes a vacuum break valve, vacuum gauge, a drain connection, and a connection for product thermocouples, and can be fitted with other connections as needed

Stokes Model 438 Heated Shelf Design



One of the key design features of the Stokes Shelf Dryer is the shelf heating connection and manifold system. The supply and return tube for each shelf protrude through the back wall of the chamber where they connect to the supply and return header. Where each shelf exits the chamber, the tube is sealed with a proprietary tube ferrule sealing the chamber and assuring the vacuum integrity of the chamber. All shelf manifold connections are located outside of the drying chamber, eliminating any possible contamination of the product from leaks in the heating manifold.

An uppermost non-usable shelf is installed serving as the heating surface for the top of the chamber assembly. The shelves are constructed and inspected for maximum steam working pressure of 50 psig and are suitably baffled for efficient heating or cooling using water, oil, or steam.

Stokes Model 438 Specifications

- Non-code chamber as standard
- Heated shelves, 50 psi design pressure
- · External manifolded shelf heating connections
- Door hinged with Viton® O-ring seal and clamps
- · Sight glasses through door
- Vacuum gauge & 4 psi vacuum break valve
- Sloped bottom for draining, includes 1 inch NPT manual drain valve.

Options

- · Carbon steel, 316LSS, or other special materials upon request
- Internal finishes: Mill finish, #4 polish, or other coating options available upon request
- Wall flange
- Upgraded elastomers
- Washdown duty
- Instrumentation
- · Additional connections
- Door validation port
- Vacuum port location
- Vacuum System
- · Heating System
- · CE Marking not available at this time
- · Other options available upon request

Glovebox Vacuum Shelf Dryers Model 438GBX



438GBX available in sizes B, D and F only.

Edwards offers a "GBX" series vacuum shelf dryer to provide an air/liquid tight seal when mating to an isolation glove box. This design includes a spigot to accept an inflatable gasket seal from a portable glove box. The spigot is sealed to the chamber with a silicone gasket to ensure full isolation. The door hinges are a double articulating davited type design to keep the door swing within the parameters of the glove box.

Data Summary Stokes Vacuum Shelf Dryers Model 438

Chamber Size

Chamber Size b		Chamber Size d			Chamber Size f			Chamber Size h			Chamber Size j								
#	Α	С	W	#	Α	С	W	#	Α	С	W	#	Α	С	W	#	Α	С	W
B-0	0.0	20.5	700	D-0	0.0	27.0	970	F-0	0.0	39.0	1600	H-0	0.0	49.0	3530	J-0	0.0	71.5	4200
B-1	4.0	16.3	920	D-1	6.0	23.0	1270	F-1	6.0	35.0	1920	H-1	12.2	44.0	4170	J-1	12.2	65.0	4840
B-2	8.0	7.6	1030	D-2	12.0	11.0	1420	F-2	12.0	17.0	2080	H-2	24.4	21.5	4490	J-2	24.4	32.0	5160
B-3	12.0	4.8	1140	D-3	18.0	7.0	1570	F-3	18.0	11.0	2240	H-3	36.7	14.0	4810	J-3	36.7	21.0	5480
B-4	16.0	3.3	1250	D-4	24.0	5.0	1720	F-4	24.0	8.0	2400	H-4	48.9	10.3	5130	J-4	48.9	15.5	5800
B-5	20.0	2.5	1360	D-5	30.0	3.8	1870	F-5	30.0	6.2	2560	H-5	61.1	8.0	5450	J-5	61.1	12.2	6120
B-6	24.0	1.9	1470	D-6	36.0	3.0	2020	F-6	36.0	5.0	2720	H-6	73.3	6.5	5770	J-6	73.3	10.0	6440
				D-7	42.0	2.4	2170	F-7	42.0	4.1	2880	H-7	85.6	5.4	6090	J-7	85.6	8.4	6760
				D-8	48.0	2.0	2320	F-8	48.0	3.5	3040	H-8	97.8	4.6	6410	J-8	97.8	7.2	7080
				D-9	54.0	1.7	2470	F-9	54.0	3.0	3200	H-9	110.0	4.0	6730	J-9	110.0	6.3	7400
								F-10	60.0	2.6	3360	H-10	122.2	3.5	7050	J-10	122.2	5.6	7720
								F-11	66.0	2.3	3520	H-11	134.4	3.1	7370	J-11	134.4	5.0	8040
								F-12	72.0	2.0	3680	H-12	146.7	2.8	7690	J-12	146.7	4.5	8360
												H-13	158.9	2.5	8010	J-13	158.9	4.0	8680
												H-14	171.1	2.2	8330	J-14	171.1	3.7	9000
												H-15	183.3	2.0	8650	J-15	183.3	3.4	9320
																J-16	195.6	3.1	9640
																J-17	207.8	2.8	9960
																J-18	220.0	2.6	10280
																J-19	232.2	2.4	10600
																J-20	244.4	2.3	10920
																J-21	256.7	2.1	11240
																J-22	268.9	2.0	11560

Useable total surface area (sq. ft.) Clearance between shelves (inches) Weight (lbs)

Dimensions and Shelf Information

Chamber		Overall Dimensions	Inte	ernal Dimensi	ons	Shelf Information			
Size	Width	Depth (Door Open)	Height	Width	Depth	Height	Volume (ft ³)	Size Each	Useable Shelves
438 B	40.5"	75"	56"	30"	29"	20.5"	10.3	24" x 24"	up to 6
438 D	40.5"	77"	66"	30"	42"	27"	19.7	24" x 36"	up to 9
438 F	40.5"	85.5"	75"	30"	42"	39"	28.4	24" x 36"	up to 12
438 H	62"	107"	77.5"	50"	46"	49"	65.2	44" x 40"	up to 15
438 J	66"	110"	99"	50"	46"	71.5"	95.2	44" x 40"	up to 22

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Service and Training







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Global Customer Support

Edwards Service at a Glance

- · Service spares, kits and tooling
- On-site support
- · Product repair and overhaul
- · Product exchange
- Upgrades
- · Refurbished product sales
- · Service contracts and agreements
- · Operation, maintenance and service training

Service Spares, Kits & Tooling

We use original parts and tooling in all service activities, and recommend that you do too. Combine our approved maintenance and overhaul schedules with original Edwards spare parts, service tooling and training courses to give you the confidence that your product will deliver years of trouble free operation.



Edwards spares are available for those wishing to service product and maintain high standards of product performance.

Onsite Support

The Edwards field service organization offers responsive support at your site, from product installation to maintenance and repair, or relocation and disposal. Wherever you are, whatever your needs, our professional team of engineers and technicians are on hand to help.

Product Repair and Overhaul

When products require more than just routine maintenance and you want the confidence afforded by the quality and standard of repair only the OEM can guarantee, then choose from our range of product repair and overhaul services. Edwards offers fixed price servicing for swift response and simple budgeting, or a flexible pricing structure for maximum cost control.



A highly trained service technician repairing an Edwards pump at Ina, Japan.

Product Exchange

If process uptime is critical, or it is simply not convenient to perform repair or maintenance work on site, the Edwards Service Exchange Programme offers rapid product replacement from a comprehensive global inventory. Products are tested as new, and come with a 12-month warranty.

Upgrades

Take advantage of the latest Edwards products by upgrading your existing equipment. We offer cost effective upgrade of most Edwards and competitor equipment, allowing you to benefit from enhanced performance and reduced operating costs. Upgrade proposals with short payback periods can be tailored to individual customer requirements and typically include removal of existing equipment, supply of new upgrade equipment and, if necessary, kits allowing straight forward adaptation of connections.

Refurbished Products

Genuine Edwards refurbished products provide a cost effective route to expand, upgrade or replace your installations without sacrificing quality, reliability or performance. Like our Service Exchange product, Refurbished products are tested as new and are supported by a 12-month warranty.

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Service Contracts and Agreements

Tailored contracts, ideal for larger installations, bring together any combination of our service product range into one package, whether for a single turnkey activity or longer term equipment maintenance and management. For smaller installations, or those under the cost control of multiple managers, Edwards provides standard fixed price contracts for simple budgeting and cost management.



Edwards support extends across our complete range of products.

Operation, Maintenance and Service Training

Avoid unplanned downtime with correct operation and maintenance by taking advantage of professional advice over the phone, practical classroom based courses at our training facilities, or dedicated onsite training for your technicians and operators.

Local Support from a Global Company

We understand the importance of local support. With over 70 service facilities worldwide, a team of over 1000 service engineers and technicians, and a growing network of service agents, Edwards is never far away. From Edwards you can expect a local, rapid response and great value service, delivered by the experts.

Consistent and Reliable Standards Wherever You Are

We develop or manufacture the training, processes, tooling and parts used throughout our service network at the factories where we develop and manufacture our products. This is why our service team is always ready to deliver quality support. As you would expect from a responsible, global company, we operate under ISO9001 and ISO14001 accreditation.

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International Training

A Very Practical Experience

Edwards offers a number of standard and customized courses at various locations around the world, and has dedicated training centers located in the UK and USA. We believe that training should not be confined to formal classroom situations. Therefore, our training centers additionally offer laboratory and workshop facilities containing a wide range of modern vacuum equipment available to put theory into practice.

Participants will spend some of their time gaining hands-on experience by carrying out various projects under supervision. These could include, for example, finding leaks in a vacuum system; correctly operating a pumping system; investigating the effects of contamination inside a vacuum system or carrying out a complete strip-down and overhaul of a pump. We also provide demonstrations and videos, as appropriate. Additionally, participants often mention the value of the informal discussions which take place.

Training given to participants will for example:

- Give them more confidence in operating and fault finding on a vacuum system
- Provide guidance on the proper care and maintenance of vacuum equipment
- Help them understand the physical principles of vacuum technology
- · Lead to more effective system design
- Encourage participation and discussion of the vacuum related problems they are facing

The Courses

We offer a variety of training courses both on-site and at our training facility in Crawley, lasting from one to five days, depending on the topic. For example:

Introductory and Applications Courses Include:

- · Practical vacuum technology
- · Vacuum system design
- Leak detection
- · Semiconductor vacuum process technology

Equipment Maintenance and Product Familiarization Courses Include:

- Vacuum pump maintenance: vane, piston, boosters and others
- Drystar[®] dry pump training
- Leak detector familiarization

The Training Centers

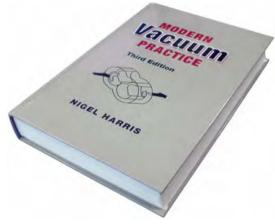
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Rotary Pump Speed and Pump-Down Time Calculations

To estimate the pump speed you need to reach a given system pressure, P:

$$S = (F \times V)/T \tag{1}$$

To estimate the time to pump-down your system to a given pressure, P:

$$T = (F \times V)/S \tag{2}$$

where T is the pump-down time

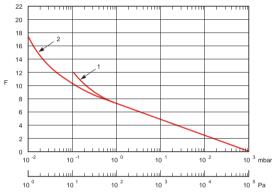
F is the pump-down factor at pressure P

V is the volume of the vacuum system

S is the speed of the rotary pump

Read F from Figure 1. T, V and S must be in consistent units: for example, T in hours, V in cubic metres and S in cubic metres per hour.

Speed and Power Curves



- 1 One-stage rotary pump
- 2 Two-stage rotary pump or pump combination

 $\textbf{Figure 1} - \mathsf{Pump-down\ factor},\ \mathsf{F},\ \mathsf{as\ a\ function\ of\ system\ pressure},\ \mathsf{mbar}$

F applies a correction for the change in the speed of rotary pumps as the inlet pressure decreases. But F does not include a correction for the effect of conductance of inter-connecting pipes (refer to the section below if you want to apply this correction).

These calculations apply to clean and leak tight vacuum systems. It is difficult to extend these curves to below 0.1 mbar, because the effect of system design and out-gassing become increasingly important at lower pressures.

For example, you have a $0.06\,\mathrm{m}^3$ (60 I) vacuum system that you must evacuate to 1 mbar in 0.05 hr (3 minutes). From Figure 1, at 1 mbar F = 7.

$$S = (F \times V)/T = (7 \times 0.06)/0.05 = 8.4 \text{ m}^3\text{h}^{-1}$$

So, you require a pump with a minimum speed of 8.4 m³h⁻¹ and an ultimate vacuum well below 1 mbar. Edwards' RV8 pump is suitable for this application.

Effect of the Conductance of Connection Pipes

Resistance to flow of gases and vapors through pipes can significantly affect the size of pump you require or the pump-down time you can achieve with a given pump. If you know the dimensions of the pipes in your system, you can correct the speed and pump-down time calculations. The conductance of 1 m lengths of pipes of various diameters is shown in Figure 2.

Please note these limitations for the data in this graph. The data shown in the dotted portions of the curves applies only to low velocity, viscous, laminar flow in long pipes (where the length of the pipe is typically many 100 times the pipe diameter). This data does not apply to turbulent flow (when the pipe conductance may be significantly reduced) or to compressed gases (such as gases in short pipes or subject to high speed flows). If your calculations are for short pipes (where the length of the pipe is typically < 100 times the pipe diameter), or for pipe diameters and pressures shown by the dotted portions of the curves in Figure 2, please refer to Wutz¹ or Dushman², or contact Edwards for advice.

Speed and Power Curves

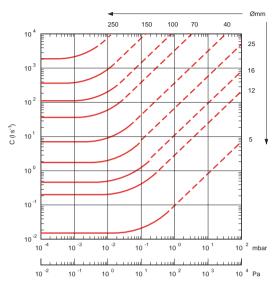


Figure 2 – Conductance of 1 m of round pipe, for air at 20 °C (the data shown in the dotted portions of the curves is for low velocity, viscous, laminar flow in long pipes)

The conductance of a pipe at a given pressure is:

$$C_p = C/L$$

where C_p is the conductance of the pipe

C is the conductance per metre, read from Figure 2

L is the length of the pipe in metres.

Then, you can use the value for C_p to correct the pumping speed at the end of the pipe when it is connected to the pump inlet; use this equation:

$$1/S_p = (1/S) + (1/C_p) \text{ or } S_p = (C_p \times S)/(C_p + S)$$
 (3)

where S_p is the pumping speed at the end of the pipe

S is the speed of the pump.

Use a similar procedure to make an approximate correction to the pump-down time calculation. First, read the value of C at the required system pressure from Figure 2, and calculate C_p for your pipe at that pressure. Then use the pump speed, S, and C_p in equation (3) to calculate the corrected speed, S_p . Use this value of S_p in equation (2) to estimate the pump-down time, T.

If you use a narrow pipe between the pump and the process chamber, this restricts the effective pumping speed. It is usually more economical to use a wider or shorter pipe and a smaller pump, than to restrict the pumping speed of a larger pump. You should aim at the effective pumping speed to be 80% or more of the pump's speed. You can use equation (3) and the graph in Figure 2 to select the minimum size of the pipe you need.

For example, you need a pumping speed of 150 m³h⁻¹ at 1.0 mbar in your process chamber, and the pump must be 6 m away from the chamber. The E1M175 (135 m³h⁻¹ at 1 mbar) is too small for this application, even without losses in the pipelines. So, consider the E1M275 pump which has a pump speed of 230 m³h⁻¹. Use equation (3) to calculate the minimum conductance of the connecting pipe:

 $C_{p=}(S\times S_p)/(S-S_p)=(230\times 150)/(230-150)=430~\text{m}^3\text{h}^{-1}$ The conductance per metre is then 430 × 6 = 2580 m³h $^{-1}$. In Figure 2, the nearest larger diameter pipe that has a conductance of 2580 m³h $^{-1}$ or more at 1.0 mbar is 70 mm. Conveniently, this is the same diameter as the inlet of the E1M275 pump.

- 1 Theory and Practice of Vacuum Technology, M Wutz, A Herman, and W Walcher, Friedr. Vieweg and Sohn, (1989)
- 2 Scientific Foundations of Vacuum Technique, 3rd ed, S Dushman and J Lafferty, Wiley (1997)

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Maximum Pipe Length for Increase in Pump-Down Time of < 20%

Table 1 gives a quick guide to the maximum length of pipe you can use to connect the pump to your vacuum system, if you want the conductance of the pipe to contribute no more than 20% to the pumpdown time.

Pump Model	Pump Inlet	Inlet Ø (mm)	Maximum Pip for Pump				
			1 m	bar	0.1 n	nbar	
			50 Hz	60 Hz	50 Hz	60 Hz	
Speedivac 2	¼ inch BSP	12	4	3.5	-	-	
E2M0.7	NW10	10	6	5	0.7	0.6	
E2M1, E2M1.5	NW10	10	3	2.5	0.3	0.3	
RV3	NW25	25	50	45	7	6	
RV5	NW25	25	35	30	4.5	3.5	
RV8	NW25	25	22	19	3	2	
RV12	NW25	25	16	14	2	1.5	
E1M18, E2M18	NW25	25	11	9	1.5	1	
E2M28	NW25	25	8	6.5	1	8.0	
E1M40, E2M40	ISO40	40	26	24	2.5	2	
E1M80, E2M80	ISO40	40	16	13	1.5	1	
E1M175, E2M175	ISO63	70	31	28	4	3.5	
E1M275, E2M275	ISO63	70	25	21	3.5	2.5	

Table 1 – Maximum pipe lengths, for an increase in pump-down time of < 20% In our calculations, we assumed that the pipes and fittings used correspond to the size of the inlet port. That is, for example, that NW25 pipes and fittings are used for the RV pumps. If you use smaller pipes and fittings, the pump-down times will be increased significantly.

How to Choose a Rotary Pump to Back a Vapor Pump

We recommend that you use two-stage rotary pumps (such as the RV5 or the E2M18 pumps) to back vapor pumps. When a vapor pump operates at its maximum specified throughput, the backing pressure must not be higher than 0.5 times the critical backing pressure. Note that the maximum throughput of most vapor pumps is calculated at 1 \times 10 $^{-2}$ mbar: the maximum throughput of vapor booster pumps is calculated at 1 mbar.

Use this equation to calculate the required rotary pump speed:

$$S \ge T_m/(0.5 \times P_{cb})$$

where $\,\,$ S is the speed of the rotary pump

 T_{m} is the maximum throughput of the vapor pump

 $\mbox{\mbox{$P$}}_{\mbox{\scriptsize cb}}$ is the critical backing pressure of the vapor pump.

For example, at 1×10^{-2} mbar and a corresponding speed of $60 \, \text{l s}^{-1}$, the maximum throughput of the Diffstak 100/300 pump is $60 \times 10^{-2} = 0.6$ mbar $1 \, \text{s}^{-1}$. The critical backing pressure of this pump with Santovac[®] 5 fluid is 0.6 mbar. So, the required rotary pump

speed is:

$$S \ge 0.6/(0.5 \times 0.6) = 2 I s^{-1} \sim 8 m^3 h^{-1}$$

The nearest larger, two-stage rotary pump suitable for this application (with no correction for pipe conductance effects) is the RV8. If the maximum throughput for your system is lower than the pump's specified maximum throughput, you may be able to use a smaller rotary pump: please contact Edwards for advice.

You must now check that the rotary pump you have selected can pump-down your vacuum system from atmospheric pressure to the critical backing pressure in an acceptable time. If it cannot, you may need to choose a larger rotary pump.

How to Choose a Rotary Pump to Back a Turbomolecular Pump

We recommend that you use two-stage rotary pumps (such as the RV5 or the E2M18 pumps) or scroll pumps to back turbomolecular pumps. The size of the rotary pump you need depends on the maximum backing pressure and the speed of the turbomolecular pump at your required system pressure:

$$S \ge (S_t \times P)/(0.5 \times P_{mb})$$

where S is the speed of the rotary pump

 \textbf{S}_{t} is the speed of the turbomolecular pump, at your required system pressure P

 \mathbf{P}_{mb} is the maximum backing pressure of the turbomolecular pump.

For conventional turbomolecular pumps, the maximum backing pressure is typically 0.1 mbar: for compound turbomolecular pumps, it is about 5 mbar.

For example, you require a system pressure of 1 \times 10⁻⁴ mbar with a conventional 200 l s⁻¹ turbomolecular pump. The required rotary pump speed is:

$$S > (200 \times 10^{-4})/(0.5 \times 0.1) = 0.4 \text{ J s}^{-1} \sim 1.44 \text{ m}^3\text{h}^{-1}$$

So, you need a rotary pump with a speed, at 0.1 mbar, of 1.44 m³h⁻¹. The nearest larger, two-stage, rotary pump suitable for this application (with no corrections for pipe conductance affects) is the RV3.

You must now check that the rotary pump you have selected can pump-down your vacuum system from atmospheric pressure to the critical backing pressure in an acceptable time. If it cannot, you may need to choose a larger pump. This is particularly important if you use a compound turbomolecular pump: the higher maximum backing pressure of these pumps mean that you can use a smaller backing pump. Note that, in all applications you will achieve a lower ultimate pressure (lower P) if you use a larger backing pump.

If you want to pump hydrogen or helium, these calculations may not apply: please contact Edwards for advice.

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Effect of the Pipe Between the Secondary Pump and the Rotary Pump

As we discussed above, the conductance of the pipe between the rotary pump and the secondary pump can reduce the effective pumping speed. This may mean that the critical backing pressure of the secondary pump is exceeded, even though the unrestricted speed of the rotary pump is adequate.

If you know the bore and length of the pipe between the rotary pump and the secondary pump, you can use equation (3) and the data in Figure 2 to calculate the pumping speed at the end of the pipe. Then, match this corrected speed to the maximum throughput of the secondary pump.

Alternatively, in Table 2, we give a quick guide to the maximum length of pipe you can use between the rotary and secondary pumps, if you want the reduction in pump speed at 0.5 mbar to be no more than 20%. In our calculations, we assumed that the pipes and fittings used correspond to the size of the inlet port. That is, for example, NW25 pipes and fittings are used for the RV pumps. If you use smaller pipes and fittings, you must use shorter pipes.

Pump Model	Pump Inlet	Inlet Ø (mm)	Maximum Pipe Length (m)		
			50 Hz	60 Hz	
Speedivac 2	¼ inch BSP	12	8.0	0.8	
E2M0.7	NW10	10	0.7	0.7	
E2M1, E2M1.5	NW10	10	0.4	0.4	
RV3	NW25	25	7	6	
RV5	NW25	25	4	3.5	
RV8	NW25	25	2.5	2	
RV12	NW25	25	1.5	1.5	
E1M18, E2M18	NW25	25	1	1	
E2M28	NW25	25	8.0	0.7	
E1M40, E2M40	ISO40	40	3.5	3.5	
E1M80, E2M80	ISO40	40	2	1.5	
E1M175, E2M175	ISO63	70	7	7	
E1M275, E2M275	ISO63	70	4.5	4.5	

Table 2 – Maximum pipe lengths, for a maximum decrease in pumping speed of 20% at 0.5 mbar

Conversions

Pressure Units

	mbar	bar	Torr	Pa (Nm ⁻²)	atm	lbf inch ⁻²
1 mbar =	1	1 x 10 ⁻³	0.75	10 ²	9.869 x 10 ⁻⁴	1.45 x 10 ⁻²
1 bar =	10 ³	1	7.5 x 10 ²	1 x 10 ⁵	0.987	14.5
1 Torr =	1.333	1.333 x 10 ⁻³	1	1.333 x 10 ²	1.316 x 10 ⁻³	1.934 x 10 ⁻²
1 Pa (Nm ⁻²) =	0.01	1 x 10 ⁻⁵	7.5 x 10 ⁻³	1	9.87 x 10 ⁻⁶	1.45 x 10 ⁻⁴
1 atm =	1.013 x 10 ³	1.013	7.6 x 10 ²	1.013 x 10 ⁵	1	14.7
1 lbf inch ⁻² =	68.95	6.895 x 10 ⁻²	51.71	6.895 x 10 ³	6.805 x 10 ⁻²	1
1 kgf cm ⁻² =	9.807 x 10 ²	0.981	7.356 x 10 ²	9.807 x 10 ⁴	0.968	14.22
1 inch Hg =	33.86	3.386 x 10 ⁻²	25.4	3.386 x 10 ³	3.342 x 10 ⁻²	0.491
1 mm Hg =	1.333	1.333 x 10 ⁻³	1	1.333 x 10 ²	1.316 x 10 ⁻³	1.934 x 10 ⁻²
1 inch $H_2O =$	2.491	2.491 x 10 ⁻³	1.868	2.491 x 10 ²	2.458 x 10 ⁻³	3.613 x 10 ⁻²
1 mm $H_2O =$	9.807 x 10 ⁻²	9.807 x 10 ⁻⁵	7.354 x 10 ⁻²	9.807	9.677 x 10 ⁻⁵	1.42 x 10 ⁻³

	kgf cm ⁻²	inch Hg	mm Hg	inch H ₂ O	mm H ₂ O
1 mbar =	1.02 x 10 ⁻³	2.953 x 10 ⁻²	0.75	0.402	10.197
1 bar =	1.02	29.53	7.5 x 10 ²	4.015 x 10 ²	1.02 x 10 ⁴
1 Torr =	1.36 x 10 ⁻³	3.937 x 10 ⁻²	1	0.535	13.59
1 Pa (Nm ⁻²) =	1.02 x 10 ⁻⁵	2.953 x 10 ⁻⁴	7.5 x 10 ⁻³	4.015 x 10 ⁻³	0.102
1 atm =	1.033	29.92	7.6 x 10 ²	4.068 x 10 ²	1.033 x 10 ⁴
1 lbf inch ⁻² =	7.03 x 10 ⁻²	2.036	51.71	27.68	7.03 x 10 ²
1 kgf cm ⁻² =	1	28.96	7.356 x 10 ²	3.937 x 10 ²	104
1 inch Hg =	3.453 x 10 ⁻²	1	25.4	13.6	3.45 x 10 ²
1 mm Hg =	1.36 x 10 ⁻³	3.937 x 10 ⁻²	1	0.535	13.59
1 inch H ₂ O =	2.54 x 10 ⁻³	7.356 x 10 ⁻²	1.868	1	25.4
1 mm $H_2O =$	10 ⁻⁴	2.896 x 10 ⁻³	7.354 x 10 ⁻²	3.394 x 10 ⁻²	1

Note also: 1 dyn cm⁻² (barye) = 0.1 Pa (Nm⁻²) = 10^{-3} mbar

Leak Rate Units

	mbar I s ⁻¹	Torr I s ⁻¹	atm cm ³ s ⁻¹	lusec	atm ft ³ min ⁻¹	grammes per year (Freon 12)
1 mbar l s ⁻¹ =	1	0.75	0.987	7.5 x 10 ²	2.097 x 10 ⁻³	1.58 x 10 ⁵
1 Torr I s ⁻¹ =	1.333	1	1.316 x 10 ³	10 ⁻³	2.795 x 10 ⁻³	2.083 x 10 ⁵
1 atm cm 3 s $^{-1}$ =	1.013	0.76	1	7.6 x 10 ²	2.12 x 10 ⁻³	1.582 x 10 ⁵
1 lusec =	1.333 x 10 ⁻³	0.001	1.32 x 10 ⁻³	1	2.79 x 10 ⁻⁶	2.083 x 10 ²
1 atm ft ³ min ⁻¹ =	4.78 x 10 ²	3.58 x 10 ²	4.72 x 10 ²	3.58 x 10 ⁵	1	7.45 x 10 ⁷
1 gramme per year	6.4 x 10 ⁻⁶	4.8 x 10 ⁻⁶	6.32 x 10 ⁻⁶	4.8 x 10 ⁻³	1.34 x 10 ⁻⁸	1
(Freon 12)						

Pumping Speed Units

	I s ⁻¹	l min ^{−1}	ft ³ min ⁻¹	m³h ^{−1}
1 s ⁻¹ =	1	60	2.12	3.60
1 l min ⁻¹ =	0.0167	1	0.0353	0.06
1 ft ³ min ⁻¹ =	0.472	28.32	1	1.70
$1 \text{ m}^3 \text{h}^{-1} =$	0.278	16.67	0.589	1

Material Safety Data Sheets

The following data sheets are available on request				
P120-01-000	Mechanical pump oil – 45			
P120-01-005	Mechanical pump oil – TW			
P120-01-010	Mechanical pump oil – Ultragrade 15, 19, 20, 70			
P120-01-015				
	Mechanical pump oil – Fomblin [®] Y/LVAC series (06/6, 14/6, 16/6, 25/6 25/9)			
P120-01-020	Mechanical pump oil – Krytox [®] 1506, 1514, 1525			
P120-01-025	Oil – Tellus 150			
P120-01-030	Drynert 25/6, gear box lubricant			
P120-01-040	Low Vac 60			
P120-01-035	Mobil SHC 629, gear box lubricant			
P120-02-000	Oil – Apiezon® A, AP201, B, BW, C & G			
P120-02-005	Oil – Apiezon® J & K			
P120-02-010	Oil – Apiezon® AP301			
P120-02-015	Diffusion pump fluid – DC702, 704EU & 705			
P120-02-020	Diffusion pump fluid – Santovac® 5			
P120-02-025	Diffusion pump fluid – Edwards L9			
P120-03-000	Grease – Fomblin [®] (AR555)			
P120-03-005	Grease – Krytox® series 240 & LVP fluorinated greases			
P120-03-010	Grease – Apiezon® H & T			
P120-03-015	Grease – Apiezon® L & M			
P120-03-020	Grease – Apiezon® N			
P120-03-025	Grease – Apiezon® AP101			
P120-03-030	Grease – Apiezon® AP100			
P120-03-035	Grease – Silicone high vacuum			
P120-04-000	Wax – Apiezon [®] W & W40			
P120-04-005	Wax – Sealing compound Apiezon [®] Q			
P120-04-010	Silcoset sealant			
P120-04-015	O-rings – Viton®			
P120-04-020	O-rings – Nitrile & rubber vacuum			
P120-04-025	O-rings – Kalrez [®]			
P120-04-030	Indium metal seals			
P120-05-000	GS battery			
P120-05-005	Grease – Asonic GHY72			
P120-06-000	Coolant – Edwards Drystar [®] 2			
P120-06-005	Coolant – HT110			
P120-07-000	Refrigerant – Edwards chiller (SUVA HP62)			
P120-08-000	GRC cartridges – C150Y/C150R/C150JV/C150W/CM10Y			
P120-08-020	GRC cartridges – C150A/C7150A			
P120-08-025	GRC cartridges – C250Y			
P120-08-005	End point detector fluid			
P120-08-010	Pipe insulation jackets			
P120-09-000	Alumina grade A (activated alumina)			
P120-09-005	Activated charcoal AC35			
P120-09-005	Rotary pump blade material – CX2			
P120-09-020	Rotary pump blade material – GE21			
P120-10-000	Leak detection/ion gauge filaments			
P120-11-010	V Lube B			
P120-11-020	V Lube F			
P120-11-030	V Lube G			
P120-11-040	V Lube H			
P120-11-050	V Lube L			

P120-11-060 V Lube W

P120-11-070	V Lube CD
P120-11-080	Heat Transfer Fluid
P120-11-090	V Lube J
P120-20-010	1-Methoxy-2-Propanol
P120-20-020	Emarald Lacquer
P120-20-030	Emarald Primer
P120-20-040	Isopropanol Anhydrous
P120-20-050	Potassium Hydroxide Solution Potassium Hydroxide Solution 30% to 50%

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Trade Marks

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Notice - Dimensions

Although every care has been taken in the preparation of dimensional drawings no responsibility can be taken for customers' work processed from this catalog.

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Accessories are occasionally included in illustrations and dimension drawings for clarity or convenience. In general this is indicated on the drawing or in the adjacent text but in the case of doubt, please verify the status of such components before ordering.

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RoHS Compliance

The EU RoHS (Restriction of certain Hazardous Substances) Directive controls the use of certain hazardous substances (lead, mercury, cadmium, hexavalent chromium, PBDE and PBE) in electrical and electronic equipment. Similar legal requirements have been implemented in many other countries.

Edwards products do not fall within the scope of the RoHS Directive, but we have a voluntary programme of RoHS compliance as part of our commitment to protecting the environment.

A wide range of Edwards products are, or will be in 2009, RoHS compliant including small rotary pumps, scientific turbo pumps, STP magnetically levitated turbo pumps, vacuum gauges and controllers, vacuum system components and flange fittings. Refer to our website for the latest information.

These items do not contain the following materials above the limits set by the European RoHS Directive, 2002/95/EC. These limits are set out in the table below.

Substance	TypicalUses	Limits** (by weight of the homogeneous material*)
Lead	Solders, pigments, PVC stabilisers, balance weights	0.1 wt%
Cadmium	Pigments, plastics stabilisers, platings, batteries, contacts	0.01 wt%
Mercury	Switch and relay contacts, batteries, sensors, fluorescent tubes	0.1 wt%
Hexavalent Chromium	Coatings and platings (esp Aluminium), metallised plastics	0.1 wt%
PBB	Flame retardant, no longer produced	0.1 wt%
PBDE	Flame retardants for variety of plastics	0.1 wt%

^{*} A single substance that could (theoretically) be mechanically separated from other substances

^{**} The EU Directive allows various exemptions – see 2002/95/EC http://ec.europa.eu/environment/waste/weee/



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